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TO
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KEY

TO

SECOND BOOK IN ARITHMETIC.

CHAPTER I.

INTEGERS.—NOTATION.

Page 15; Article 29.

A.—First column.

Twenty-five million twenty-five thousand twenty-five.
Three thousand three.
Forty thousand four hundred twenty-five.
Two billion two million two thousand two.

Second column.

Six hundred billion.
Fifty-five billion fifty-five million.
Eight thousand two hundred eight.
Sixty-six million six hundred six thousand sixty-six.

Third column.

Fifteen million fifteen thousand one hundred fifty-five.
Two hundred thousand three hundred eighty-six.
One million eight hundred ninety.
Two hundred sixty million ten thousand three.

Fourth column.

Eighteen thousand eighteen.
Nine hundred one billion twenty million two thousand nine hundred fifty.
Twenty-five thousand twenty-five.
Seven hundred ninety-one million fifty-six thousand eight hundred nine.

Page 16.

B.—1. 6,000,030
70,045

2. 16,408,052

3. 730,378

4. 4,000,080,306

5. 39,000,709,000

6. 420,095,000,070

C.—1. 37,098,420

2. 8,050,000
90,600,009
81,012

3. 601,000,306

4. 9,000,270,000

5. $90.10; $.12

6. $20,607.08; $49

7. 15,004,009,820

8. $6,101.05

9. 100,025,400
400,000,700,000

10. 917,003,000,016; 90,005

ADDITION.

Page 30; Article 46.

C. 1

Houses,	$ 1,830 1,830
City lot,	2,210
Farm,	12,125
Amount,	$17,995

2

C has $ 4,258
B " $4,258 + $ 328 = 4,586
A " 4,586 + 529 = 5,115
D " 4,258 + 4,586 + $5,115 = 13,959
The four men have $27,918

3

35,876,120
396,491
543,607
Sum, 36,816,218

4

Cost,	$1,804 1,602 2,355
Profit,	2,395
Receipts,	$8,156

5

Oranges,	$15.45
Lemons,	20.34
Pine-apples,	27.59
Cocoa-nuts,	16.72
Total cost,	$80.10

Page 31.

6

Farm,	$3,256
Live stock,	1,217
Implements,	557
Crops,	373
Repairs,	439
Outlay,	$5,842

7

Hotel,	$14,100
Stable,	885
House,	2,637
Warehouse,	3,233
Total,	$20,855

3

Monday,	$ 52.18
Tuesday,	68.47
Wednesday,	45.52
Thursday,	78.77
Friday,	80.16
Saturday,	119.82
Amount,	$444.92

9

Sugars,	$ 486.69
Teas,	390.25
Fruits,	166.50
Other goods,	1,767
Amount,	$2,810.44

10

15,009,017
9,000,508
675,899
245,326,008
Sum, 270,011,432

Page 31.

11

N. A.,	8,593,000	sq. mi.
S. A.,	7,362,000	"
Europe,	3,825,000	"
Asia,	17,300,000	"
Africa,	11,557,000	"
Total,	48,637,000	"

12

364 cd.
729 "
95 "
832 "
723 "
407 "
634 "
3,784 "

13

1,120 lb.
1,312 "
1,250 "
1,547 "
1,420 "
6,649 "

14

$ 1,328,654
6,863
11,496
2,000,342
658
9,891
78,620
1,060,909
5,683
22,408
23,684,901
846
29
4,803
$28,216,103

16

$ 58.48
368.—
37.28
9.99
48.06
768.04
362.22
8.37
$1,660.44

Page 32.

15

$315.78
282.25
106.45
24.90
14.04
$743.42

17

Rent,	$1,335.—
Clerk hire,	2,447.—
Fuel,	292.25
Gas,	259.19
Freights, &c.,	875.—
Other expenses,	1,936.—
Total,	$7,144.44

18

Monday,	$ 98.19
Tuesday,	132.—
Wednesday,	198.07
Thursday,	272.63
Friday,	115.01
Saturday,	295.—
Total,	$1,110.90

19

1,286	bu.	wheat;
229	"	corn;
144	"	buckwheat;
683	"	oats;
257	"	rye;
599	"	barley.
3,198	*bu.*	*grain.*

20

$ 901.32
321.09
288.58
124.15
150.75
50.90
$1,836.79

21

99,099
27,000,500
42,002,005
408,096
5,437
69,515,137

22

907,805,074
1,950
24,000,024
7,819,000
612
157
939,626,817

SUBTRACTION.

Page 46.—D.

1. 1774 yr. − 46 yr. = 1728 yr. 2. 1799 yr. − 67 yr. = 1732 yr.

Page 47.

3	4	5	6	7
1613 yr.	1620 yr.	1776 yr.	1848 yr.	Present year.
1565 "	1565 "	1565 "	1620 "	1492 "
48 "	55 "	211 "	228 "	"

8	9	10
$11,000, total tax;	$33,296, receipts;	21,286 ft.
5,680, Co. and State tax;	22,535, expenses;	5,506 "
$5,320, town tax.	$10,761, net earnings.	15,780 "

11	12	13
50,000 rifles delivered;	Min. 125,365,948	26,957,229 bu.
41,715 " accepted;	Sub. 8,700,966	14,094,227 "
8,285 " condemned.	Rem. 116,664,982	12,863,002 "

14.

A is worth		$25,864;
B " "	$25,864 − $1,350 =	24,514;
C " "	24,514 − 965 =	23,549;
D " "	23,549 − 7,393 =	16,156.

Page 48.

1

The three persons earned $2,395
The two sons earned $709 + $531 = 1,240
The father earned $1,155

2

Whole number who entered the city, 93,825
26,759 by railroads + 60,048 by steamboats = 86,807
From foreign countries, 7,018

Page 49.

3

He sold the horses for $37,496
They cost him $25,267 + $6,485 = 31,752
Profits, $5,744

4

36,000,005		
105,701	96,300	45,114,796
9,009,090	42,009	138,309
45,114,796	138,309	44,976,487

5	6
Receipts, $439 + $218 = $657	Gains, $6,760 + $3,650 = $10,410
Expenses, 124 + 84 = 208	Losses, 3,400 + 3,954 = 7,354
Profits, $449	Total gain, $3,056

Page 49.

7

Value of property, January 1,	$10,350.75
Less the debts,	1,050.31
Net value,	$9,300.44
Year's earnings,	1,156
Increase in value of property,	550
Value of property, December 31,	$11,006.44
Less the expenditures,	975.25
Net value,	$10,031.19

8

Purchase,	370 hhd.;	weight,	372,960 lb.
Sales,	195 "	"	196,725 "
On hand,	175 "	"	176,235 "

9

415,678 T.	in the five weeks;
234,509 "	" first four weeks;
181,169 "	" fifth week.

10

Edition published January 1,	11,000 copies.
Sales, 996+1,025+2,363+1,808+845+2,471 copies=	9,508 "
Unsold, July 1,	1,492 "

MULTIPLICATION.

Page 69.—A.

11. 9 × 84 passengers = 756 passengers.

12. 168 × 8 acres = 1,344 acres.

13. 470 × 290 pounds = 136,300 pounds.

14. 56 × 150 barrels = 8,400 barrels.

15. 359 × 97 tons = 34,823 tons.

16. 282 × $825 = $232,650.

17. 234 × 108 persons = 25,272 persons.

18. 1,000 × 642 feet = 642,000 feet.

Page 70.—C.

15. 1,056 × 245 pounds = 258,720 pounds.

16. 365 × 156 times = 56,940 times.

Page 70.—C.

17

12 eggs in 1 doz.
83
996 " " 1 bar.
23
22,908 " " 23 "

Page 71.

18

2× 108 mi. = 216 mi. in 1 round trip;
225× 216 " = 48,600 " 1 yr.;
13×48,600 " = 631,800 " 13 "

19

20× 24 sheets = 480 sheets in 1 rm.
45×480 " = 21,600 " " 45 rm.

20

10×(3 doz. =) 36 buttons = 360 buttons in a package;
(7×12 =) 84×360 " = 30,240 " " 7 doz. packages.

21

12×$ 3 = $ 36 per case;
45× 36 = 1,620 for 45 cases.

22

237×345 bar. = 81,765 bar.

23

6×$ .65 = $ 3.90 for 1 set (6 chairs);
319× 3.90 = 1,244.10 " 319 sets.

Page 72.

1. 25×36 sq. mi. = 900 sq. mi.
3. $127+(5×$39) = $322
4. 12×$56−$608 = $64

2

1 line weighs 882 lb.;
9 lines weigh 9×462 lb. = 4,158 "
The 10 lines weigh 5,040 "

5

In 1 mo. he saves $150−$68 = $ 82;
" 1 yr. " " 12×$82 = 984.

6

2×198 ft. + 2×143 ft. = 682 ft. of fence;
682×3 pickets = 2,046 pickets.

7

25×$41.81 = $1,045.25

8

36×$ 6 = $ 216 that 36 boarders will pay in 1 week;
52× 216 = 11,232 " 36 " " " 52 weeks.

9

179× 95 lb. = 17,005 lb., weight of 1 car-load;
17×17,005 " = 289,085 " " " 17 car-loads.

10

12× 42 yd. = 504 yd. in 1 case;
37×504 " = 18,648 " " 37 cases.

Page 73.

11

Receipts,	$5,000
Cost, 40 × $120 =	4,800
Gain,	$200

12

5 × 102 bu. =	510 bu.
8 × 119 " =	952 "
Total,	1,462 "

13

125 × $ 39 = $ 4,875, wages for 1 mo.;
12 × 4,875 = 58,500, " " 1 yr.

14

Crop of oats,		1,221 bu.
For seed,	85 bu.	
" 9 horses, 9 × 50 bu. =	450 "	535 "
	Sold	686 "

15

5 hhd. of 1,125 lb. each,	= 5,625 lb.
Shortage, 72 lb. + 56 lb. + 38 lb. + 112 lb. + 47 lb. =	325 "
Net weight,	5,300 "

16

24 sets of 45 pieces each = 1,080 pieces;
29 " " 37 " " = 1,073 "
36 " " 80 " " = 2,880 "
89 " 5,033 "

17

He sold 27 cattle @ $37.75, and (69 − 27 =) 42 cattle @ $36.50.
" " 27 " for 27 × $37.75 = $1,019.25
" " 42 " " 42 × 36.50 = 1,533 $2,552.25
The 69 cattle cost him 69 × $28.75 = 1,983.75
He gained $568.50

18

Cost, 806 × $16.50 =	$13,299
Profits,	1,847
Receipts,	$15,146

19

First farm,	$ 675
Second " 2 × $675	= 1,350
Third " 4 × ($675 + $1,350)	= 8,100
The three farms,	$10,125

DIVISION.

Page 98.—B.

1. 16,236 sheep ÷ 4 = 4,059 sheep.

2. At 1 bu. of wheat for 1 bar. of flour, 1,965 bu. would make 1,965 bar.;

At 5 bu. for 1 bar., 1,965 bu. will make 1 fifth of 1,965 bar.

1,965 bar. ÷ 5 = 393 bar.

Page 98.

3. 4,800 miles ÷ 25 = 192 miles.

4. 43,200 A. ÷ 96 = 450 A.

5

43 yd. = 43 dress patterns of 1 yd. each;
43 dress patterns ÷ 13 = 3 dress patterns of 13 yd. each, and 4 dress patterns of 1 yd. each,—or 4 yd. over.

6

$1,680 = 1,680 sewing-machines at $1 apiece;
1,680 sewing-machines ÷ 35 = 48 sewing-machines at $35 each.

7. 4,928 da. ÷ 112 = 44 da.

Page 99.

8. $1,543.50 ÷ 686 = $2.25.

9. $1,030.80 ÷ 6,872 = $ .15.

10. 50,000 oranges ÷ 100 = 500 oranges.

11. 237,600 lb. = 237,600 bar. if 1 lb. fills 1 bar.
237,600 bar. ÷ 200 = 1,188 bar. of 200 lb. each.

12. 57,475 yd. = 57,475 da. if 1 yd. is made per da.
57,475 da. ÷ 275 = 209 da. at 275 yd. per da.

13. $1,072 ÷ 8 = $134.

14. 2,520 bu. ÷ 36 = 70 bu.

15. 74,232 bu. ÷ 18 = 4,124 bu.

16

962 gal. = 962 casks if 1 gal. fills 1 cask.
962 casks ÷ 41 = 23 casks of 41 gal. each, and 19 gal. remaining.

17. $39,865 ÷ 2,345 = $17.

18. 69,420 lb. ÷ 1,157 = 60 lb.

19

$1,407.60 = 1,407.60 mi. if it costs but $1 to keep 1 mile in repair.
1,407.60 mi. ÷ 30.60 = 46 mi. at the rate of $30.60 per mi.

20

39,520 quires ÷ 1,976 = 20 quires.

21 ***Page 99.***

20,000 lb. = 20,000 kettles if 1 lb. makes 1 kettle.
20,000 kettles ÷ 348 = 57 kettles of 348 lb. each, and 164 lb. rem.

Page 100.

1

284
150
2)434
217

2

375
645
2)1,020
510

3

49
196
442
3)687
229

4

266
55
738
3)1,059
353

5

48
79
263
590
4)1,016
254

6

808
103
643
3)1,554
518

7

6 yr.
9 "
12 "
3)27 "
9 "

8

8 in.
14 "
2)22 "
11 "

9

47 mi.
29 "
17 "
3)93 "
31 "

10

135 gal.
143 "
127 "
3)405 "
135 "

11

134 pupils.
128 "
143 "
133 "
147 "
5)685 "
137 "

12

19,110 yd.÷78=245 yd.

13

28 A. cost 28×$36=$1,008
35 " " 35×$27= 945
63 " " $1,953
Average price per A., $1,953÷63=$31.

14

$ 348.91 Monday
317.07 Tuesday
294.63 Wednesday
336.— Thursday
332.87 Friday
369.— Saturday
6)$1,998.48 week
$333.08 daily average

Sixteen General Problems.

Page 104.

1

954
3,420
75
3,659
251
8,000
11,756
8
9,999
730
28,028
66,880

2

9,000,001, minuend;
365,497, subtrahend;
8,634,504, remainder.

3

$1,000
324.09
$675.91

Page 105.

4

$3{,}600 \times 72{,}394 = 260{,}618{,}400$

5

31,654, sum;
2,870, one number;
28,784, the other number.

6

$93{,}268 \times 50 = 4{,}663{,}400$

7

317 (quotient) × 94 (divisor) = 29,798 (dividend)

8

$1 is contained in $1,810.50 1,810.50 times;
1,810.50 times ÷ 25.50 = 71 times.

9

$100{,}000 - (8{,}400 + 9 + 55{,}374 + 286 + 6{,}857 + 2{,}002) = 27{,}072.$

10

$25,408 − $18,976 = $6,432
$6,432 ÷ 24 = 268

11

$36 \times 25 \times 300 \times 46 = 12{,}420{,}000$
$12{,}420{,}000 \div 50 = 248{,}400$

12

875,004, minuend;
208,365, remainder;
666,639, subtrahend.

13

$964.87, subtrahend;
215.13, remainder;
$1,180 minuend.

14

36, quotient;) 23,040, dividend;
640, divisor.

15

70,000 (divisor) × 66 (integer of quotient) + 60,000 (remainder) = 4,680,000 (dividend).

16

$100 + 67 + 229 + 80 + 924 = 1{,}400;\ 1{,}400 \times 5 = 7{,}000.$

17

$527 \times 55 \times 9 - 253{,}974 = 6{,}891;\ 6{,}891 \div 3 = 2{,}297.$

18

$17{,}984 \div 281 = 64;\ 64 - 28 = 36.$

19

$1 is contained in $525.75 525.75 times;
525.75 ÷ 21.03 = 25 (quotient)
809 × 25 = 20,225
20,225 − 5,000 = 15,225

20 ***Page 105.***

Beginning with the last number given, and tracing the process back to the first number, we have

491 (quotient) × 12 = 5,892, product;
5,892 (product) ÷ 6 (multiplier) = 982, remainder;
982 (remainder) + 438 (subtrahend) = 1,420, sum;
1,420 (sum) − 267 (one part) = 1,153, required number.

REVIEW PROBLEMS IN INTEGERS.

1 ***Page 106.***

$1,000 ÷ 12 = $$83\frac{1}{3}$ or $$83.33\frac{1}{3}$ per month;
$1,000 ÷ 52 = $$19\frac{3}{13}$ or $$19.23\frac{1}{13}$ per week.

2

12,500 bu. − 7,645 bu. = 4,855 bu.

3

45 × $ 6 = $ 270, receipts for 1 week;
26 × 270 = 7,020, " " 26 weeks.

Page 107.

4

123 bar.
1,075 "
3,550 "
1,805 "
987 "
562 "
8,102 "

5

$130,480.50
55,297.50
$75,183

6

1,072,512 lb. = 1,072,512 bales at 1 lb. for 1 bale.
1,072,512 bales ÷ 400 = 2,681 bales of 400 lb. each, and 112 lb. rem.

7

8 × 34 mi. = 272 mi. west;
176 " east;
96 " from Philadelphia.

8

7 × $ 15 = $105;
$105 + 139 = 244.

9. 432,740 yd. ÷ 308 = 1,405 yd.
10. 616,000 lb. ÷ 308 = 2,000 lb.
11. 1,071,399 yd. ÷ 357,133 = 3 yd.

12

$6,000 + $7,281 = $13,281;
$13,281 ÷ 3 = 4,427.

13

1,050 × 2,240 lb. = 2,352,000 lb.;
2,352,000 lb. = 1,176 T. of 2,000 lb. each.

Page 107.

14

385 lb.
367 "
418 "
374 "
396 "
405 "
373 "
402 "
8)3,120 "
390 "

15

$16,575 = 16,575 payments of but $1 each.
16,575 payments ÷ 1,200 = 13 payments of $1,200 each and 1 payment of $975,—or 14 payments in all.

Page 108.

16

355 lb. + 424 lb. + 391 lb. + 330 lb. = 1,500 lb.
1,500 lb. = 1,500 tubs if 1 lb. fills 1 tub.
1,500 tubs ÷ 50 = 30 tubs of 50 lb. each.

Page 109.

1

1st flock,	184 sheep;	sold 114 sheep;
2d "	218 "	" 189 "
3d "	65 "	" 48 "
	467 sheep —	351 sheep sold=116 sheep remaining.

2

67 lb. + 93 lb. = 160 lb.;
$ .18−$ .15=$ .03, gain per lb.,
160×$ .03=$4.80, total gain.

3

$92+$172=$264 (cost)=264.cwt. at $1 for 1 cwt.;
264 cwt.÷12=22 cwt. at $12 per cwt.

4

115×$ .11=$12.65, cost of hams;
43× .13= 5.59, " " bacon;
$18.24, total cost.

5

2,468 bar. − 1,382 bar. = 1,086 bar.;
$4,146 ÷ 1,382 = $3 per "
$4,344 ÷ 1,086 = $4 " "

6

36×$40=$1,440=1,440 A. at $1.— per A.;
1,440 A.÷2.25= 640 " " 2.25 " "

7

Selling price per head, $63.50
Buying " " " 49.63
Gain " " $13.87
$1,511.83=1,511.83 head at $1 per head;
1,511.83 head ÷ 13.87=109 head.

Page 109.

8

Salary,		$1,250
Personal expenses,	$753	
For village lot,	225	
For improvements,	149	1,127
He then had		$ 123

9

Cost of the goods,	$15,284
Cash payment,	2,684
To be paid in monthly payments,	$12,600

$12,600 = 12,600 payments of $1 each;
12,600 payments ÷ 1,575 = 8 payments of $1,575 each.

10

(52+39)×$3=$273, total expenses;
$273÷39=$7 paid by each gentleman.

Page 110.

11

Wages,		$312
Paid for board, 12×$13=	$156	
" " other expenses,	100	256
He saved		$56

12

He bought 16×43 yd.=	688 yd.
He sold	155 "
He then had	533 "

533 yd.=533 dress patterns if it takes but 1 yd. for 1 dress pattern.
533 dress patterns ÷ 13 = 41 dress patterns of 13 yd. each.

13

He contracted to deliver		5,000 cd.
He delivered 35×76 cd.=	2,660 cd.	
24×54 " =	1,296 "	3,956 "
To be delivered,		1,044 "

14

14 shares+6 shares+12 shares=32 shares;
$2,240 ÷ 32=$70 for each share.

The captain received	14×$70=	$980
" mate "	6× 70=	420
Each sailor "	1× 70=	70

Page 110.

15

Value of farm-house,	$ 2,450
" " farm, 12 × $2,450 − $600 =	28,800
" " stock, 2 × 2,450 =	4,900
Total value,	$36,150

16

Sold the wood for	$2,378
" " land " 60 × $18 =	1,080
Total receipts,	$3,458
Cost of wood lot, 60 × $48 =	2,880
I gained	$ 578

17

Total investment,	$3,000
Gains, $756 + (3 × $748 =) $2,244 =	3,000
Total of investment and gains,	$6,000
Deduct losses,	1,652
He was then worth	$4,348

18

Deposits: $5,878.50 + $1,250 + $750 + $1,000 + $1,500 =	$10,378.50
Checks: $360.25 + $145 + $75.50 =	580.75
Balance in bank,	$9,797.75

19

Receipts.	
For wheat,	$ 650
" barley,	205
" corn,	97
" oats,	150
Total,	$1,102

Expenses.	
For farm hand, 9 × $13 =	$117
" fertilizers,	250
" utensils and repairs,	65.75
Total,	$432.75

He cleared $1,102 − $432.75 = $669.25

CHAPTER II.

DECIMALS.—NOTATION.

Page 116.

1. .009; .023; 85.7; 4.276.
2. 9.0018; 55.05; .2987; 4.0068001.
3. 400,000.00004 | **4.** 1,000.20084; 7,017.000004.
5. 78,000.000219; .00106204; 6.00000049.

Page 117.

6. 41,036.273
7. .00014
8. 44.00044
9. 206,470.3
10. 50,000,000.50512
11. 101,101,101.01001001
12. 61,032,876.2850041
13. 172.8; .00624.
14. 152,000,650.50040036
15. 65,000.0007 | **16.** 30.6008

Page 118.

1. 22 cents 5 mills.
2. 7 mills.
3. 5 dollars 75 cents 1 mill.
4. 300 dollars 56 cents 7 mills.
5. 12 dollars 10 cents 8 mills.
6. 90 dollars 2 cents 5 mills.
7. $ .008; $ .156 | **8.** $83.125 | **9.** $400.081

10

$ .125,—12 cents 5 mills.
$ .0625,—6 cents 2 and 5 tenths mills.
$ .1875,—18 cents 7 and 5 tenths mills.

11

$ .65375,—65 cents 3 and 75 hundredths mills.
$ .85625,—85 cents 6 and 25 hundredths mills.
$ .02875,—2 cents 8 and 75 hundredths mills.
$ .00125,—1 and 25 hundredths mills.

12. $ .37½; $ .20¼; $1.09⅛; $10.00⅝; $105.56⅞.
13. $75.37½ **14.** $1,000.01⅒ **15.** $9.09⅛
16. $15.43¾; $4.03⅛. **17.** $ .12½; $ .31¼.

REDUCTION.

Page 119.

14. 5.3=5.300

15. .07=.070000

16. 18.602=18.6020

17	**18**	**19**
1.2000	30.251000	6.0108
4.3700	.008900	57.8000
192.0004	3.000004	234.0000
		2.3400

Page 120.

1. 93 dollars=9,300 cents.
2. 86,000 cents=$860.
3. 57 cents=570 mills.
4. 359 mills=35.9 cents.
5. 218 dollars=218,000 mills.
6. 9,274 mills=$9.274.
7. $ .40=400 mills.
8. 6,000 cents=$60.
9. $3=300 cents=3,000 mills.
10. 3,219 mills=321.9 cents.
11. $3.40=3,400 mills.
12. 3,219 mills=$3.219.
13. $ .09=90 mills ; $ .83=830 mills.
14. $ .213=213 mills ; $ .605=605 mills.
15. $7=7,000 mills ; $32=32,000 mills ; $ .082=82 mills.
16. $4=400 cents, $15=1,500 cents.
17. $3.27=327 cents ; $10.50=1,050 cents.
18. 875 mills=87.5 cents.
19. 800 cents=$3.
20. 4,275 cents=$42.75.
21. 2,047 mills=$2.047.

ADDITION.

Page 121.

9

For vases,	4.75	oz.
" goblets,	8.65	"
" napkin rings,	10.6	"
Total,	24	"

Page 122.

10

Feb.,	.732	T.
Mar.,	.824	"
Apr.,	.688	"
May,	.595	"
Total,	2.839	"

11

1st field,	11.25	A.
2d "	6.75	"
3d "	13.33	"
4th "	8.72	"
Total,	40.05	"

12

3.75 bu.
5.625 "
9.5 "
6.25 "
25.125 "

13

2.25 bu.
1 "
3.5 "
4.75 "
3.225 "
14.725 "

14

200.04
5,108.007003
113,706.2504
10.000055
119,024.297458

15

Sold the horse for	$183.75
Loss,	24.50
Cost of horse,	$208.25
To gain	39.70
Horse must sell for	$247.95

16

January,	$ 56.25
February,	45.63
March,	67.50
April,	65.875
May,	75
Total,	$310.255

17

Buttons,	$ 1.08
Ribbon,	.375
Muslin,	1.1875
Needles,	.3125
Belt,	.75
Dress,	10.625
Amount,	$14.33

18

117.5 gal.
124 "
129.3175 "
104.75 "
130.0625 "
131.5625 "
737.1925 "

Page 122.

19

.967
.00054
953.5
7.375
1,000.0001
6.75
8.80808
483
2,460.40072

SUBTRACTION.

Page 123.

11

43.5 yd.
26.8 "
16.7 "

12

362.413 mi.
81.0064 "
281.4066 "

Page 124.

13

13.03 in.
11.37 "
1.66 "

14

240.475 mi.
168.025 "
72.45 "

15

42 gal.
31.25 "
10.75 "

16

134 rd.
65.87 "
68.13 "

17

5 lb.
2.0625 "
2.9375 "

18

95.8005
10.44
85.3605

19

79.95 ft.
4.7 "
75.25 "

20

412.5 gr.
41.25 "
371.25 "

21

860.04
19.09054
840.94946

22

1,203.625 lb.
450.4375 "
753.1875 "

23

$1.875, value in New York;
1.1875, " " Milwaukee;
$ .68¾, " added.

Page 125.

24

320.5 bar.
192.8125 "
127.6875 "

25

$80
18.75
$61.25

26

$94.37
26.75
$67.62

27

1,438.275 T. in the cargo;
561.895 " melted;
876.38 " reached Mobile;
561.895 "
314.485 " more.

28

Paid for jar of butter, $15.375
" in cloth, $6.875
" " groceries, 4.625 — 11.50
" " money, $ 3.875

Page 125.

29

He raised		32.25	bu.
" sowed	4.03125 bu.		
" sold	12.125 "	16.15625	"
" had left		16.09375	"

30

Week's wages,		$6
For flour,	$1.625	
" tea,	.85	
" sugar,	.75	
" butter,	.375	3.60
He had		$2.40

31

The ice-house contained		500 T.
Sales;	18.263 T.	
	15.967 "	
	17.4 "	
	16.48 "	68.11 "
Ice left,		431.89 "

32

Cask at first contained		37.175 gal.
Drawn out;	.125 gal.	
	1.5 "	
	.25 "	
	.75 "	2.625 "
Cask then contained		34.55 "

33

Cost of ox,			$63.37
Receipts;	For meat,	$61.96	
	" tallow,	6.08	
	" hide,	8.55	76.59
		Profits,	$13.22

34

Required area of farm,		200 A.
1st field,	53.843 A.	
2d "	75.364 "	
3d "	15.527 "	144.734 "
He must purchase		55.266 "

35

	Receipts.	*Investments.*	*Gains and Losses.*	
For oats,	$2,022.45;	$1,750.25;	$272.20, gain.	
" corn,	831.50;	786.37½;	45.12½, "	$317.32½, gain.
" wheat,	2,331.30;	2,648.62½;		317.32½, loss.
Totals,	$5,185.25;	$5,185.25.	Gains and losses are equal.	

Page 129.

11. 9×.085 lb.=.765 lb.
12. 25×62.75 yd.=1,568.75 yd.
13. 128×3.69 rd.=472.32 rd.
14. 164.25×94.2 T.=15,472.35 T.
15. 38.5×3.75 gal.=144.375 gal.
16. .84×$4.25=$3.57, cost.
17. 15,000×$1.0625=$15,937.50
18. 18.4×$3.12½=$57.50
19. 7×39×$ .375=$102.375
20. .456×$28.60=$13.04
21. 1,000,000×$ .0001=$100

22

2.5×$3.75 =$ 9.375, cost of broadcloth;
.875, " " cashmere;
26 × .12½= 3.25, " " calico;
14 × .35 = 4.90, " " muslin;
$18.40, total cost.

23

6×($2.75−$1.40)=$8.10

24

Sold oil for 42.5×$1.12½=$47.8125
Cost of oil, 37.1875
Gain, $10.625

Page 135.

7

264 yd.=264 lb. at 1 lb. per yd.;
264 lb.÷.625=422.4 lb.

8

204 bar.=204 h. at 1 bar. per h.
204 h.÷18.75=10.88 h.

9

16 mi.=16 h. at 1 mi. per h.
16 h.÷31.25=.512 h.

Page 136.

10

147 bu.÷2.24=65.625 bu.

11

112.59 lb.=112.59 gal. at 1 lb. per gal.
112.59 gal.÷.18=625.5 gal.

12

5.831 cd.=5.831 bu. at 1 cd. for 1 bu.
5.831 bu.÷.0196=297.5 bu.

13

$564.375÷105=$5.375

14

$35=35 lb. of sugar at $1 per lb.
35 lb.÷.12½=280 lb.

15

$172.50=172.5 lounges at $1 each;
172.5 lounges÷7.5=23 lounges.

16

$59.0625÷31.5=$1.875

17

$1.875=1.875 bu. at $1 per bu.
1.875 bu.÷2.50=.75 bu.

18

$24.36=24.36 yd. at $1 per yd.
24.36 yd.÷.56=43.5 yd.

Page 136. **19**

176 oz. = 176 goblets if 1 oz. makes 1 goblet.
176 goblets ÷ 7.5 = 23 goblets of 7.5 oz. each, and 3.5 oz. rem.

20

815,105 lb. = 815,105 T. if 1 lb. is 1 ton.
815,105 T. ÷ 2,000 = 407 T. of 2,000 lb. each, and 1,105 lb. over.

21

124.2 T. = 124.2 car loads if 1 T. makes 1 car load.
124.2 car loads ÷ 9.5 = 13 car loads of 9.5 T. each, and 7 T. over.

22

134 bu. = 134 sheep if 1 bu. pays for 1 sheep.
134 sheep ÷ 2.5 = 53 sheep at 2.5 bu. each, and 1.5 bu. rem.

23

.95 A. = .95 of 1 lot if each lot is 1 A.
.95 lot ÷ .125 = 7 lots of .125 A. each, and .075 A. rem.

24

834.25 lb. = 834.25 da. if he uses but 1 lb. per da.
834.25 da. ÷ 23.75 = 35 da. at 23.75 lb. per da., and 3 lb. over.

ACCOUNTS AND BILLS.

Page 137. **1**

Buffalo, *June 17, 1882.*

Mr. *Arthur Newman*

Bought of **B. F. Brown & Co.**

4 papers Garden Seeds,	@	*$ .10*	*$ 40*
5 Lamp Chimneys,	″	*.09*	*.45*
4 Sacks Flour,	″	*2.12½*	*8.50*
1 Corn Cultivator,			*9.25*
1 Spade, $ .75 ; 1 Spading Fork, $1.25			*2.—*
2 Hoes, $ .63 and $ .81,			*1.44*
			$22.04

2 **Page 138.**

Cleveland, *Sept. 6, 1882.*

Mr. *James W. Graham*

Bought of Henry Arnold

5 lb. Java Coffee,	@ 28¢	$1.40
10 '' Crackers,	'' 11¢	1.10
6 '' Butter,	'' 30¢	1.80
1 doz. Oranges,		.28
1 lb. Japan Tea,		1.10
1 Willow Basket,		.35
		$6.03

Rec'd payment,

Henry Arnold.

3

Philadelphia, *Dec. 6, 1882.*

Mrs. *Eliza Williams*

Bought of Charles Roberts & Co.

2 doz. Silver Table Forks,	@ $37.50	$75.—
1 '' '' '' Spoons,		33.—
3 Sets '' Tea ''	'' 9.25	27.75
1 Silver Cake Basket,		37.50
		$173.25

Rec'd payment,

Charles Roberts & Co.

4

Albany, N. Y., *Nov. 1, 1882.*

Mr. *Joseph Daniels*

Bought of James Riley & Co.

15.5 T. Stove Coal,	@ $4.75	$73.63
19 '' Grate ''	'' 5.12½	97.37
14 cd. Wood,	5.25	73.50
		$244.50

Page 138.

5

Springfield, *Dec. 24, 1881.*

Mr. *Lyman A. Moore*

Bought of **Jones & Bogart**

1 ps.	*Lonsdale Cotton, 42 yd.,*	@	*12½¢*	*$ 5.25*
5 yd.	*French Broadcloth,*	*''*	*$4.75*	*23.75*
16 ''	*Merrimac Prints,*	*''*	*9¢*	*1.44*
8 ''	*Irish Linen,*	*''*	*68¾¢*	*5.50*
12 ''	*Hamburg Edging,*	*''*	*37½¢*	*4.50*
				$40.44

Chgd. in account,

Jones & Bogart.

General Review Problems.

Page 139.

1

.012×.12 = .00144
.00144÷.0006=2.4

2

900.0009−.0909=899.91
899.91÷.900 =999.9

3

.01÷12.8=.00078125

4

$900−$100=$800
$800÷52 = $15.38+

5

137.55×105.6 T.=14,525.28 T

6

25,380×$.04½=$1,142.10

7

365×$.05=$18.25

8

31×22.5 da. =697.5 da.
$1,046.25÷697.5=$1.50

9

$.37½=.375 bu. at $1 per bu.;
.375 bu.÷3=.125 " " $3 " "

10

2.736 qt. =2.736 A. at 1 qt. per A.
2.736 A.÷5.76= .475 " " 5.76 " " "

11

$ 38.75
10.50
182.50
6.—
58.75
2.50
1,057.50
30.—
1.50
8.60
141.80
3.75
530.—
1,515.—
137.60
6.70
199.60
895.—
9.60
3.50
266.75
176.25
2.75
$5,234.90

12 *Page 139.*

25 lb. of sugar=25 jars at 1 lb. to a jar;
25 jars ÷ .375=66 full jars, and .25 of a jar of 1 lb.,—or .25 lb. left.

13 *Page 140.*

823.3 bu. on 15 A.
466.45 " " 7 "
1,289.75 " " 22 "
1,289.75 bu. ÷ 22 = 58.625 bu., av. per A.

14

57.36 mi. − (25 mi. + 17 mi.) = 15.36 mi.
25 mi. @ $13,758.40 cost $343,960
17 " " 16,521.72 " 280,869.24
15.36 " " 18,125.12½ " 278,401.92
Total cost, $903,231.16
$903,231.16 ÷ 57.36 = $15,746.71, av. cost per mi.

15

Laborer earns 6 × $1.31¼ = $ 7.87½
Wife " 6 × .62½ = 3.75
3 children earn 3 × 6 × .37½ = 6.75
The family earn $18.375

16. $437.50 ÷ 100 = $4.375

17. 3.27 × 415 bu. = 1,357.05 bu.

18. .85 × 1.876 T. = 1.5946 T.

19. 1.0000 − .3125 = .6875

20

Materials cost $2,641.375
Labor " 1,796.50
Total " $4,437.875
Contract price, 3,725
He lost $ 712.875

21. 32.5 × $ .56¼ = $18.28 +

Page 140.

22

……………………, ——————, *18*—.

Mary Morton

Bought of ——————————

15 yd.	*Dress Silk,*	@	*$1.75*	*$26.25*
3 ″	*Satin,*	″	*1.87½*	*5.63*
6 ″	*French Lace,*	″	*.81¼*	*4.87*
12 ″	*Gingham,*	″	*.28*	*3.36*
			Amount,	*$40.11*

23

Philadelphia, *May 1, 18*—.

Andrew Erwin

Bo't of **Potter & Co.**

6 pr.	*Calf Boots,*	@	*$4.50*	*$27.—*
8 ″	*Kip ″*	″	*3.62½*	*29.—*
4 ″	*Ladies' Kid Boots,*	″	*2.75*	*11.—*
12 ″	*″ Cloth ″*	″	*2.12½*	*25.50*
			Amount,	*$92.50*

Received payment, *Potter & Co.*

CHAPTER III.

PROPERTIES OF NUMBERS.—FACTORS AND DIVISORS.

Page 143.

1

315	105	35	7
3	3	5	7

2

436	218	109
2	2	109

3

555	185	37
3	5	37

4

863, prime No.

5

729	243	81	27	9	3
3	3	3	3	3	3

6

954	477	159	53
2	3	3	53

Page 143.

7

2,838	1,419	473	43
2	3	11	43

8

9,765	3,255	1,085	217	31
3	3	5	7	31

Article 145.

1

36	18	9
80	40	20

2 2

2

64	32	16	8	4	2
96	48	24	12	6	3

2 2 2 2 2

3

72	36	18	9	3
240	120	60	30	10

2 2 2 3

5

45	15	3
105	35	7
180	60	12

3 5

6

52	26	13
72	36	18
148	74	37

2 2

4

120	60	30	15	3
400	200	100	50	10

2 2 2 5

Page 144; Article 149.

1

96	48	24	12	6	3
128	64	32	16	8	4

2 × 2 × 2 × 2 × 2 = 32

2

240	120	60	30	15	5	1
1,200	600	300	150	75	25	5

2 × 2 × 2 × 2 × 3 × 5 = 240

3

196	98	49	7
84	42	21	3

2 × 2 × 7 = 28

4

102	34	2
153	51	3

3 × 17 = 51

5

351	117	39	13	1
3,861	1,287	429	143	11

3 × 3 × 3 × 13 = 351

6

105	35	7
135	45	9
180	60	12

3 × 5 = 15

7

288	144	72	36	12	4
216	108	54	27	9	3
504	252	126	63	21	7

2 × 2 × 2 × 3 × 3 = 72

8

280	140	70	10
196	98	49	7
112	56	28	4

2 × 2 × 7 = 28

9

168	84	12
280	140	20
182	91	13
252	126	18

2 × 7 = 14

10

2,835	945	315	105	35	7
5,670	1,890	630	210	70	14
4,455	1,485	495	165	55	11

3 × 3 × 3 × 3 × 5 = 405

Page 145.

1

28	14	2
98	49	7

2 × 7 = 14

2

116	58	29
732	366	183

2 × 2 = 4

3

252	126	63	9
280	140	70	10

2 × 2 × 7 = 28

Page 145.

4

450	225	75	25
792	396	132	44

2 × 3 × 3 = 18

5

18	6	2
27	9	3
45	15	5

3 × 3 = 9

6

78	39	13
90	45	15
378	189	63

2 × 3 = 6

7

2,835	567
2,455	491
5,670	1,134

5

8

3,150	1,575	525	175	35	7
4,050	2,025	675	225	45	9
4,950	2,475	825	275	55	11

2 × 3 × 3 × 5 × 5 = 450

9

160	80	40	8
100	50	25	5

2 × 2 × 5 = 20

The greatest common divisor of the given numbers equals the required length. Hence, 20 rods.

10

(1) The greatest common divisor of the given numbers equals the number of bushels in a bag; and

(2) One half of the number of bushels of each kind of grain equals the number of bags of each kind.

1,200	600 =	No. bags wheat;
864	432 =	" " corn;
784	392 =	" " barley;
1,786	893 =	" " oats.

2 = No. bu. in a bag.

11

(1) The greatest common divisor of the given numbers equals the number of yards required for each room; and

(2) The times the sum of the given numbers contains the number of yards required for one room, equals the number of rooms carpeted.

1,080	540	270	135	27	1,080 yd.
360	180	90	45	9	360 "
680	340	170	85	17	680 "
480	240	120	60	12	480 "

2 × 2 × 2 × 5 = 40 = 40 yd. 2,600 "

2,600 yd. = 2,600 rooms at 1 yd. to a room.
2,600 rooms ÷ 40 = 65 rooms at 40 yd. to a room.

12

(1) The greatest common divisor of the given numbers equals the number of yards used for each suit; and

(2) The times the sum of the given numbers contains the number of yards used for one suit equal the number of suits.

95	19	95 yd.
205	41	205 "
380	76	380 "

5 = 5 yd. 680 "

680 yd. = 680 suits at 1 yd. to a suit.
680 suits ÷ 5 = 136 " " 5 " " "

MULTIPLES.

Page 147; Article 153.

1. $9\times16=144$

2. $17\times22=374$

3. $5\times12\times19=1,140$

4. $8\times13\times50=5,200$

5. $10\times11\times3\times31=10,230$

6. $6\times29\times67=11,658$

Page 148.

1

$$\begin{array}{l} 24=2\times2\times2\times3 \\ 66=2\times3\times11 \\ \hline 66\times2\times2=264 \end{array}$$

2

$$\begin{array}{l} 15=3\times5 \\ 100=2\times2\times5\times5 \\ \hline 100\times3=300 \end{array}$$

3

$$\begin{array}{l} 8=2\times2\times2 \\ 12=2\times2\times3 \\ 48=2\times2\times2\times2\times3 \\ \hline 48 \end{array}$$

4

$$\begin{array}{l} 6=2\times3 \\ 15=3\times5 \\ 90=2\times3\times3\times5 \\ \hline 90 \end{array}$$

5

$$\begin{array}{l} 9=3\times3 \\ 21=3\times7 \\ 27=3\times3\times3 \\ 63=3\times3\times7 \\ \hline 63\times3=189 \end{array}$$

6

$$\begin{array}{l} 32=2\times2\times2\times2\times2 \\ 56=2\times2\times2\times7 \\ 72=2\times2\times2\times3\times3 \\ 96=2\times2\times2\times2\times2\times3 \\ \hline 96\times3\times7=2,016 \end{array}$$

7

$$\begin{array}{l} 18=2\times3\times3 \\ 24=2\times2\times2\times3 \\ 36=2\times2\times3\times3 \\ \hline 36\times2=72 \end{array}$$

8

$$\begin{array}{l} 30=2\times3\times5 \\ 75=3\times5\times5 \\ 115=5\times23 \\ \hline 115\times2\times3\times5=3,450 \end{array}$$

9

$$\begin{array}{l} 54=2\times3\times3\times3 \\ 72=2\times2\times2\times3\times3 \\ 126=2\times3\times3\times7 \\ \hline 126\times3\times2\times2=1,512 \end{array}$$

10

$$\begin{array}{l} 75=3\times5\times5 \\ 225=3\times3\times5\times5 \\ 400=2\times2\times2\times2\times5\times5 \\ \hline 400\times3\times3=3,600 \end{array}$$

11

$$\begin{array}{l} 16=2\times2\times2\times2 \\ 25=5\times5 \\ 49=7\times7 \\ 81=3\times3\times3\times3 \\ \hline 81\times2\times2\times2\times2\times5\times5\times7\times7=1,587,600 \end{array}$$

12

$$\begin{array}{l} 132=2\times2\times3\times11 \\ 216=2\times2\times2\times3\times3\times3 \\ 1,728=2\times2\times2\times2\times2\times2\times3\times3\times3 \\ \hline 1,728\times11=19,008 \end{array}$$

Page 149.

1. $50\times81=4,050$

2. $3\times8\times70=1,680$

3. $20\times67=1,340$

4. $135\times318=42,930$

5

$1 \quad \cancel{2} \quad \cancel{3} \quad \cancel{4} \quad 5 \quad 6 \quad 7 \quad 8 \quad 9$

5 and 7 are prime numbers.

$$\begin{array}{l} 6=2\times3 \\ 8=2\times2\times2 \\ 9=3\times3 \\ \hline 9\times2\times2\times2\times5\times7=2,520 \end{array}$$

6

$\cancel{5} \quad 10 \quad 34 \quad 51 \quad 85$

$$\begin{array}{l} 10=2\times5 \\ 34=2\times17 \\ 51=3\times17 \\ 85=5\times17 \\ \hline 85\times2\times3=510 \end{array}$$

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7

$\cancel{9}$ $\cancel{12}$ $\cancel{15}$ $\cancel{18}$ 35 45 60 72

35=5×7
45=3×3×5
60=2×2×3×5
72=2×2×2×3×3

72×5×7=2,520

8

$\cancel{7}$ 15 21 28 35 100 125

15=3×5
21=3×7
28=2×2×7
35=5×7
100=2×2×5×5
125=5×5×5

125×3×7×2×2=10,500

9

The least common multiple of the numbers expressing the prices equals the required sum.

27¢ 36¢ $\cancel{45}$¢ 90¢

27=3×3×3
36=2×2×3×3
90=2×3×3×5

90×3×2=540

Hence, $5.40

10

The least common multiple of the numbers expressing the bushels the men can pick, respectively, equals the required number of bushels.

40=2×2×2×5
48=2×2×2×2×3
64=2×2×2×2×2×2

64×5×3=960

Hence, 960 bu.

11

(1) The least common multiple of the given numbers equals the required number of minutes; and

(2) The times the required number of minutes contains the number of minutes in which each man travels one mile, equals the required number of miles.

240 min. = 240 mi. at 1 mi. per min.

12 = 2×2×3
16 = 2×2×2×2
20 = 2×2×5

20×3×2×2 = 240 = 240 min. each walks.

240 mi. ÷ 12 = 20 mi., A's distance;
240 " ÷ 16 = 15 " B's "
240 " ÷ 20 = 12 " C's "

12

The least common multiple of the given numbers equals the required number of gallons.

$\cancel{34}$ $\cancel{54}$ 68 108 238

68=2×2×17
108=2×2×3×3×3
238=2×7×17

238×2×3×3×3=12,852

Hence, 12,852 gal.

CANCELLATION.

Page 151.

1

$$\frac{\overset{3}{\overset{\cancel{9}}{\cancel{72}}}}{\cancel{3}\times\cancel{8}}=3$$

2

$$\frac{\cancel{5}\times\cancel{5}\times5}{\underset{\cancel{5}}{\cancel{25}}}=5$$

3

$$\frac{\overset{2}{\cancel{10}}\times\overset{2}{\cancel{12}}}{\cancel{5}\times\cancel{6}}=4$$

4

$$\frac{\overset{2}{\cancel{14}}\times\overset{2}{\cancel{16}}\times\overset{2}{\cancel{18}}}{\cancel{7}\times\cancel{8}\times\cancel{9}}=8$$

Page 152.

5

$$\frac{\overset{3}{\cancel{240}}\times\overset{3}{\cancel{99}}}{\cancel{80}\times\cancel{33}}=9$$

6

$$\frac{\overset{4}{\cancel{20}}\times\overset{16}{\cancel{32}}\times\overset{4}{\cancel{44}}}{\cancel{5}\times\underset{3}{\cancel{6}}\times\cancel{11}}=\frac{256}{3}=85\frac{1}{3}$$

7

$$\frac{\overset{\cancel{5}}{\cancel{35}}\times17}{\cancel{5}\times\cancel{7}}=17$$

8

$$\frac{\overset{\cancel{2}}{\cancel{8}}\times\cancel{5}\times\cancel{3}\times\overset{2}{\cancel{6}}}{\underset{\cancel{3}}{\cancel{9}}\times\cancel{10}\times\underset{\cancel{2}}{\cancel{4}}}=2$$

9

$$\frac{7\times\cancel{12}\times\cancel{6}\times\cancel{16}}{\underset{\cancel{6}}{\cancel{72}}\times\underset{2}{\cancel{32}}}=\frac{7}{2}=3\frac{1}{2}$$

10

$$\frac{\overset{5}{\overset{\cancel{75}}{\cancel{975}}}}{\cancel{13}\times\cancel{15}}=5$$

11

$$\frac{\overset{7}{\overset{\cancel{105}}{\cancel{1,365}}}}{\cancel{13}\times\cancel{15}}=7$$

12

$$\frac{\cancel{5}\times\overset{4}{\cancel{28}}\times\cancel{5}}{\underset{\underset{\cancel{7}}{\cancel{35}}}{\cancel{175}}}=4$$

13

$$\frac{\cancel{5}\times9\times\cancel{5}\times\cancel{7}}{\underset{\underset{\cancel{5}}{\cancel{35}}}{\cancel{175}}}=9$$

14

$$\frac{\overset{20}{\cancel{200}}\times\cancel{24}\times\overset{\cancel{6}}{\cancel{36}}}{\underset{\cancel{6}}{\cancel{144}}\times\underset{\cancel{10}}{\cancel{60}}}=20$$

15

$$\frac{\overset{5}{\overset{\cancel{20}}{\cancel{7,800}}}}{\cancel{390}\times\cancel{4}\times8}=\frac{5}{3}=1\frac{2}{3}$$

16

$$\frac{\overset{9}{\cancel{27}}\times\overset{\cancel{5}}{\cancel{55}}\times\overset{8}{\cancel{96}}\times\overset{\cancel{3}}{\cancel{84}}}{\underset{\cancel{3}}{\cancel{33}}\times\underset{11}{\cancel{132}}\times\cancel{28}\times\underset{\cancel{3}}{\cancel{15}}}=\frac{72}{11}=6\frac{6}{11}$$

17

$$\frac{\cancel{4}\times\cancel{15}\times\overset{\cancel{3}}{\overset{\cancel{9}}{\cancel{27}}}}{\cancel{3}\times\cancel{3}\times\cancel{4}\times\underset{\cancel{3}}{\cancel{45}}}=1$$

18

$$\frac{\overset{\cancel{6}}{\cancel{24}}\times\cancel{9}\times\overset{\cancel{3}}{\cancel{15}}\times\overset{\cancel{3}}{\cancel{21}}}{\cancel{5}\times\cancel{7}\times\underset{\cancel{4}}{\cancel{36}}\times\underset{\underset{\underset{2}{\cancel{6}}}{\cancel{18}}}{\cancel{108}}}=\frac{1}{2}$$

19

6 lb. of butter @ 40¢ pay for 6×40 lb. of coffee @ 1¢, or for $\frac{1}{30}$ of 6×40 lb. @ 30¢.

$$\frac{\cancel{6}\times\overset{8}{\cancel{40}}\text{ lb.}}{\underset{\cancel{5}}{\cancel{30}}}=8\text{ lb.}$$

Page 152.

20

360 sheep @ \$2.75 per head buy 360 × 2.75 cows @ \$1 per head, or $\frac{1}{45}$ of 360 × 2.75 cows @ \$45 per head.

$$\frac{\overset{8}{\cancel{360}}\times 2.75\text{ cows}}{\cancel{45}} = 22\text{ cows}$$

21

36 lb. of tea @ 75¢ pay for 36 × 75 bu. of turnips @ 1¢, or for $\frac{1}{25}$ of 36 × 75 bu. @ 25¢.

$$\frac{36\times\overset{3}{\cancel{75}}\text{ bu.}}{\cancel{25}} = 108\text{ bu.}$$

22

$$\frac{2\times 8\times\overset{6}{\cancel{24}}\text{ mi.}}{\cancel{4}} = 96\text{ mi.}$$

23

60 bu. of wheat @ \$2 are worth 60 × 2 T. of hay @ \$1, or $\frac{1}{20}$ of 60 × 2 T. @ \$20.

$$\frac{\overset{3}{\cancel{60}}\times 2\text{ T.}}{\cancel{20}} = 6\text{ T.}$$

24

$$\frac{\overset{7}{\cancel{35}}\times\overset{\$32}{\cancel{\$64}}}{\underset{\underset{3}{\cancel{6}}}{\cancel{30}}} = \frac{\$224}{3} = \$74\tfrac{2}{3}$$

25

$$\frac{\overset{4}{\cancel{12}}\times\overset{10}{\cancel{30}}\text{ da.}}{\underset{\cancel{3}}{\cancel{9}}} = 40\text{ da.}$$

26

$$\frac{\overset{3}{\cancel{12}}\times\overset{5}{\cancel{10}}\times\overset{2}{\cancel{30}}\text{ da.}}{\underset{\cancel{2}}{\cancel{15}\times\cancel{8}}} = 30\text{ da.}$$

CHAPTER IV.

FRACTIONS.—REDUCTIONS.

Page 157.

1 $\frac{8\div 2}{18\div 2}=\frac{4}{9}$

2 $\frac{15\div 3}{27\div 3}=\frac{5}{9}$

3 $\frac{40\div 5}{25\div 5}=\frac{8}{5}$

4 $\frac{24\div 12}{36\div 12}=\frac{2}{3}$

5 $\frac{34\div 17}{51\div 17}=\frac{2}{3}$

6 $\frac{21\div 7}{49\div 7}=\frac{3}{7}$

7 $\frac{16\div 16}{80\div 16}=\frac{1}{5}$

8 $\frac{27\div 9}{153\div 9}=\frac{3}{17}$

9 $\frac{60\div 15}{165\div 15}=\frac{4}{11}$

10 $\frac{187\div 17}{85\div 17}=\frac{11}{5}$

11 $\frac{207\div 9}{99\div 9}=\frac{23}{11}$

12 $\frac{128\div 8}{88\div 8}=\frac{16}{11}$

13 $\frac{39\div 13}{143\div 13}=\frac{3}{11}$

14 $\frac{143\div 13}{273\div 13}=\frac{11}{21}$

15 $\frac{528\div 4}{1004\div 4}=\frac{132}{251}$

Page 158.

16

$\frac{210}{336}$ yd. $\frac{\div 42}{\div 42} = \frac{5}{8}$ yd.

17

$\frac{3872}{5808}$ da. $\frac{\div 1936}{\div 1936} = \frac{2}{3}$ da.

18

$\$\frac{81 \div 27}{108 \div 27} = \$\frac{3}{4}$; $\$\frac{96 \div 24}{120 \div 24} = \$\frac{4}{5}$

19

$\frac{56|000}{64|000}$ lb. $\frac{\div 8}{\div 8} = \frac{7}{8}$ lb.

20

$\$\frac{40824|00 \div 2268}{113400|00 \div 2268} = \$\frac{18}{5}$

21

$\frac{1976|0}{2912|0}$ T. $\frac{\div 104}{\div 104} = \frac{19}{28}$ T.

Page 159.

1

$468 \div 3 = 156$

$\frac{1 \times 156}{3 \times 156} = \frac{156}{468}$

2

$160 \div 8 = 20$

$\frac{7 \times 20}{8 \times 20} = \frac{140}{160}$

3

$600 \div 40 = 15$

$\frac{3 \times 15}{40 \times 15} = \frac{45}{600}$

4

$275 \div 25 = 11$

$\frac{3 \times 11}{25 \times 11} = \frac{33}{275}$

5

$900 \div 2 = 450$

$\frac{1 \times 450}{2 \times 450} = \frac{450}{900}$

6

$297 \div 9 = 33$

$\frac{4 \times 33}{9 \times 33} = \frac{132}{297}$

7

$285 \div 15 = 19$

$\frac{7 \times 19}{15 \times 19} = \frac{133}{285}$

8

$1{,}152 \div 12 = 96$

$\frac{5 \times 96}{12 \times 96} = \frac{480}{1152}$

9

$801 \div 89 = 9$

$\frac{31 \times 9}{89 \times 9} = \frac{279}{801}$

10

$1{,}184 \div 296 = 4$

$\frac{117 \times 4}{296 \times 4} = \frac{468}{1184}$

11

$1{,}728 \div 144 = 12$

$\frac{37 \times 12}{144 \times 12} = \frac{444}{1728}$

12

A, $\$\frac{11}{16}$
B, $\$\frac{5 \times 2}{8 \times 2} = \$\frac{10}{16}$
C, $\$\frac{3 \times 4}{4 \times 4} = \$\frac{12}{16}$
C has the most money.

13

Pulverized sugar, $\frac{5}{12}$ bar. $= \frac{50}{120}$ bar.
Granulated " $\frac{17}{40}$ " $= \frac{51}{120}$ "
Crushed " $= \frac{53}{120}$ "
He has the most of crushed sugar.

Page 160; Article 183.

1

$\frac{1 \times 2 \times 3}{7 \times 2 \times 3} = \frac{6}{42}$

$\frac{1 \times 7 \times 3}{2 \times 7 \times 3} = \frac{21}{42}$

$\frac{2 \times 7 \times 2}{3 \times 7 \times 2} = \frac{28}{42}$

2

$\frac{3 \times 11}{8 \times 11} = \frac{33}{88}$

$\frac{2 \times 8}{11 \times 8} = \frac{16}{88}$

3

$\frac{7 \times 18}{13 \times 18} = \frac{126}{234}$

$\frac{17 \times 13}{18 \times 13} = \frac{221}{234}$

4

$\frac{1 \times 5 \times 3 \times 4}{2 \times 5 \times 3 \times 4} = \frac{60}{120}$

$\frac{3 \times 2 \times 3 \times 4}{5 \times 2 \times 3 \times 4} = \frac{72}{120}$

$\frac{1 \times 2 \times 5 \times 4}{3 \times 2 \times 5 \times 4} = \frac{40}{120}$

$\frac{3 \times 2 \times 5 \times 3}{4 \times 2 \times 5 \times 3} = \frac{90}{120}$

Page 160. **5**

$\frac{5\times7\times9\times11}{6\times7\times9\times11}=\frac{3465}{4158}$

$\frac{5\times6\times9\times11}{7\times6\times9\times11}=\frac{2970}{4158}$

$\frac{5\times6\times7\times11}{9\times6\times7\times11}=\frac{2310}{4158}$

$\frac{5\times6\times7\times9}{11\times6\times7\times9}=\frac{1890}{4158}$

6

$\frac{3\times25\times81}{8\times25\times81}=\frac{6075}{16200}$

$\frac{3\times8\times81}{25\times8\times81}=\frac{1944}{16200}$

$\frac{7\times8\times25}{81\times8\times25}=\frac{1400}{16200}$

7

$\frac{1\times8\times5\times12\times2}{3\times8\times5\times12\times2}=\frac{960}{2880}$

$\frac{1\times3\times5\times12\times2}{8\times3\times5\times12\times2}=\frac{360}{2880}$

$\frac{1\times3\times8\times12\times2}{5\times3\times8\times12\times2}=\frac{576}{2880}$

$\frac{1\times3\times8\times5\times2}{12\times3\times8\times5\times2}=\frac{240}{2880}$

$\frac{1\times3\times8\times5\times12}{2\times3\times8\times5\times12}=\frac{1440}{2880}$

8

$\frac{2\times3\times13\times7\times5\times17}{11\times3\times13\times7\times5\times17}=\frac{46410}{255255}$

$\frac{2\times11\times13\times7\times5\times17}{3\times11\times13\times7\times5\times17}=\frac{170170}{255255}$

$\frac{2\times11\times3\times7\times5\times17}{13\times11\times3\times7\times5\times17}=\frac{39270}{255255}$

$\frac{2\times11\times3\times13\times5\times17}{7\times11\times3\times13\times5\times17}=\frac{72930}{255255}$

$\frac{2\times11\times3\times13\times7\times17}{5\times11\times3\times13\times7\times17}=\frac{102102}{255255}$

$\frac{2\times11\times3\times13\times7\times5}{17\times11\times3\times13\times7\times5}=\frac{30030}{255255}$

9

$\frac{5\times5\times4\times7}{8\times5\times4\times7}=\frac{700}{1120}$

$\frac{2\times8\times4\times7}{5\times8\times4\times7}=\frac{448}{1120}$

$\frac{1\times8\times5\times7}{4\times8\times5\times7}=\frac{280}{1120}$

$\frac{6\times8\times5\times4}{7\times8\times5\times4}=\frac{960}{1120}$

Page 161. **10**

$13\times8\times10\times5\times12=23{,}400$, the required denominator.

11

$\frac{1}{24192}$ is the required common fractional unit.

$\frac{1\times12\times7\times8\times9}{4\times12\times7\times8\times9}=\frac{6048}{24192}$

$\frac{5\times4\times7\times8\times9}{12\times4\times7\times8\times9}=\frac{10080}{24192}$

$\frac{2\times4\times12\times8\times9}{7\times4\times12\times8\times9}=\frac{6912}{24192}$

$\frac{3\times4\times12\times7\times9}{8\times4\times12\times7\times9}=\frac{9072}{24192}$

$\frac{8\times4\times12\times7\times8}{9\times4\times12\times7\times8}=\frac{21504}{24192}$

Page 162. **1**

$$\begin{array}{r|r|r} 12 & 6 & 3 \\ 16 & 8 & 4 \\ \hline \end{array}$$

$48\div12=4$

$48\div16=3$

$2\times2\times3\times4=48$

$\frac{7\times4}{12\times4}=\frac{28}{48}$; $\frac{9\times3}{16\times3}=\frac{27}{48}$

2

$$\begin{array}{r|r} 10 & 2 \\ 25 & 5 \\ \hline \end{array}$$

$50\div25=2$

$50\div10=5$

$5\times2\times5=50$

$\frac{6\times2}{25\times2}=\frac{12}{50}$; $\frac{7\times5}{10\times5}=\frac{35}{50}$

3

$$\begin{array}{r|r|r|r} 12 & 4 & 2 & \\ 8 & 8 & 4 & 2 \\ 3 & & & \\ \hline \end{array}$$

$24\div12=2$

$24\div8=3$

$24\div3=8$

$3\times2\times2\times2=24$

$\frac{5\times2}{12\times2}=\frac{10}{24}$; $\frac{1\times3}{8\times3}=\frac{3}{24}$; $\frac{2\times8}{3\times8}=\frac{16}{24}$

4

$$\begin{array}{r|r|r} 6 & 2 & \\ 4 & 4 & 2 \\ 9 & 3 & 3 \\ \hline \end{array}$$

$36\div6=6$

$36\div4=9$

$36\div9=4$

$3\times2\times2\times3=36$

$\frac{1\times6}{6\times6}=\frac{6}{36}$; $\frac{3\times9}{4\times9}=\frac{27}{36}$; $\frac{4\times4}{9\times4}=\frac{16}{36}$

6 ***Page 162.***

5

$$\begin{array}{r|r|r|r} 20 & 4 & 2 & \\ 8 & 8 & 4 & 2 \\ 5 & & & \\ \hline \end{array}$$

$5 \times 2 \times 2 \times 2 = 40$

$40 \div 20 = 2$
$40 \div 8 = 5$
$40 \div 5 = 8$

$\frac{13 \times 2}{20 \times 2} = \frac{26}{40}$; $\frac{3 \times 5}{8 \times 5} = \frac{15}{40}$; $\frac{2 \times 8}{5 \times 8} = \frac{16}{40}$

6

$$\begin{array}{r|r|r} 6 & 2 & \\ 4 & 4 & 2 \\ 12 & 4 & 2 \\ \hline \end{array}$$

$3 \times 2 \times 2 = 12$

$12 \div 6 = 2$
$12 \div 4 = 3$
$12 \div 12 = 1$

$\frac{5 \times 2}{6 \times 2} = \frac{10}{12}$; $\frac{3 \times 3}{4 \times 3} = \frac{9}{12}$; $\frac{11}{12}$

7

$$\begin{array}{r|r|r} 15 & 3 & \\ 25 & 5 & 5 \\ 9 & 9 & 3 \\ 24 & 24 & 8 \\ \hline \end{array}$$

$5 \times 3 \times 5 \times 3 \times 8 = 1{,}800$

$1{,}800 \div 15 = 120$
$1{,}800 \div 25 = 72$
$1{,}800 \div 9 = 200$
$1{,}800 \div 24 = 75$

$\frac{7 \times 120}{15 \times 120} = \frac{840}{1800}$; $\frac{17 \times 72}{25 \times 72} = \frac{1224}{1800}$;
$\frac{5 \times 200}{9 \times 200} = \frac{1000}{1800}$; $\frac{11 \times 75}{24 \times 75} = \frac{825}{1800}$

8

$$\begin{array}{r|r|r} 5 & & \\ 45 & 9 & 3 \\ 9 & 9 & 3 \\ 15 & 3 & \\ 3 & 3 & \\ \hline \end{array}$$

$5 \times 3 \times 3 = 45$

$45 \div 5 = 9$
$45 \div 45 = 1$
$45 \div 9 = 5$
$45 \div 15 = 3$
$45 \div 3 = 15$

$\frac{4 \times 9}{5 \times 9} = \frac{36}{45}$; $\frac{38}{45}$; $\frac{7 \times 5}{9 \times 5} = \frac{35}{45}$;
$\frac{11 \times 3}{15 \times 3} = \frac{33}{45}$; $\frac{1 \times 15}{3 \times 15} = \frac{15}{45}$

9

$$\begin{array}{r|r|r|r} 9 & 3 & & \\ 4 & 4 & 4 & 2 \\ 18 & 6 & 2 & \\ 6 & 2 & 2 & \\ \hline \end{array}$$

$3 \times 3 \times 2 \times 2 = 36$

$36 \div 9 = 4$
$36 \div 4 = 9$
$36 \div 18 = 2$
$36 \div 6 = 6$

$\frac{5 \times 4}{9 \times 4} = \frac{20}{36}$; $\frac{1 \times 9}{4 \times 9} = \frac{9}{36}$;
$\frac{7 \times 2}{18 \times 2} = \frac{14}{36}$; $\frac{5 \times 6}{6 \times 6} = \frac{30}{36}$

10

$$\begin{array}{r|r|r} 8 & 4 & 2 \\ 2 & & \\ 70 & 35 & 35 \\ 108 & 54 & 27 \\ \hline \end{array}$$

$2 \times 2 \times 2 \times 35 \times 27 = 7{,}560$;

Hence, $\frac{1}{7560}$.

Page 163.

1

$\frac{528}{3} = 528 \div 3 = 176$

2

$\frac{126}{7} = 126 \div 7 = 18$

3

$\frac{1596}{6} = 1{,}596 \div 6 = 266$

4

$\frac{207}{11} = 207 \div 11 = 18\frac{9}{11}$

5

$\frac{375}{32} = 375 \div 32 = 11\frac{23}{32}$

6

$\frac{5375}{23} = 5{,}375 \div 23 = 233\frac{16}{23}$

7

$\frac{176}{3} = 176 \div 3 = 58\frac{2}{3}$

8

$\frac{704}{16} = 704 \div 16 = 44$

9

$\frac{587}{54} = 587 \div 54 = 10\frac{47}{54}$

10

$\frac{3402}{9} = 3{,}402 \div 9 = 378$

11

$\frac{1031}{25} = 1{,}031 \div 25 = 41\frac{6}{25}$

12

$\frac{2500}{40} = 2{,}500 \div 40 = 62\frac{1}{2}$

Page 163.

13
$\frac{35216}{8} = 35{,}216 \div 8 = 4{,}402$

14
$\frac{1384}{5} = 1{,}384 \div 5 = 276\frac{4}{5}$

15
$\frac{1265}{7} = 1{,}265 \div 7 = 180\frac{5}{7}$

16
$\frac{1661}{11} = 1{,}661 \div 11 = 151$

17
$\frac{675}{4} = 675 \div 4 = 168\frac{3}{4}$

18
$\frac{2317}{27} = 2{,}317 \div 27 = 85\frac{22}{27}$

19
$\frac{10000}{16} = 10{,}000 \div 16 = 625$

20
$\frac{57642}{133} = 57{,}642 \div 133 = 433\frac{53}{133}$

21
$\frac{153}{8}$ T. $= 153$ T. $\div 8 = 19\frac{1}{8}$ T.

22
$\frac{1760}{3}$ bu. $= 1{,}760$ bu. $\div 3 = 586\frac{2}{3}$ bu.

23
$\$\frac{1954}{4} = \$1{,}954 \div 4 = \$488\frac{1}{2}$

24
$\$\frac{1451}{4} = \$1{,}451 \div 4 = \$362\frac{3}{4}$

25
$\$\frac{7563}{8} = \$7{,}563 \div 8 = \$945\frac{3}{8}$

Page 164.

1
$18 \times \frac{9}{9} = \frac{162}{9}$

2
$24 \times \frac{4}{4} + \frac{1}{4} = \frac{97}{4}$

3
$36 \times \frac{8}{8} + \frac{3}{8} = \frac{291}{8}$

4
$7 \times \frac{53}{53} + \frac{11}{53} = \frac{382}{53}$

5
$37 \times \frac{37}{37} = \frac{1369}{37}$

6
$11 \times \frac{15}{15} + \frac{4}{15} = \frac{169}{15}$

7
$17 \times \frac{8}{8} + \frac{1}{8} = \frac{137}{8}$

8
$27 \times \frac{12}{12} + \frac{7}{12} = \frac{331}{12}$

9
$24 \times \frac{8}{8} + \frac{3}{8} = \frac{195}{8}$

10
$2 \times \frac{250}{250} + \frac{3}{250} = \frac{503}{250}$

11
$14 \times \frac{20}{20} + \frac{3}{20} = \frac{283}{20}$

12
$75 \times \frac{30}{30} + \frac{7}{30} = \frac{2257}{30}$

13
$17 \times \frac{95}{95} + \frac{3}{95} = \frac{1618}{95}$

14
$20 \times \frac{81}{81} + \frac{7}{81} = \frac{1627}{81}$

15
$106 \times \frac{40}{40} + \frac{9}{40} = \frac{4249}{40}$

16
$87 \times \frac{50}{50} + \frac{3}{50} = \frac{4353}{50}$

17
$5 \times \frac{149}{149} + \frac{36}{149} = \frac{781}{149}$

18
$21 \times \frac{63}{63} + \frac{47}{63} = \frac{1370}{63}$

19
$31 \times \frac{9}{9} + \frac{5}{9} = \frac{284}{9}$

20
$33 \times \frac{11}{11} + \frac{9}{11} = \frac{372}{11}$

21
$115 \times \frac{237}{237} + \frac{18}{237} = \frac{27273}{237}$

22
$86 \times \frac{2567}{2567} + \frac{931}{2567} = \frac{221693}{2567}$

ADDITION.

Page 167.

1

$$\frac{3}{10}+\frac{5}{13}=\frac{39+50}{130}=\frac{89}{130}$$

2

$$\frac{7}{12}+\frac{9}{10}=\frac{35+54}{60}=\frac{89}{60}=1\frac{29}{60}$$

3

$$\frac{6}{7}+\frac{1}{5}+\frac{1}{4}=\frac{120+28+35}{140}=1\frac{43}{140}$$

6

$$\frac{2}{3}+\frac{3}{4}+\frac{1}{6}=\frac{8+9+2}{12}=\frac{19}{12}=1\frac{7}{12}$$

8

$$\frac{7}{10}+\frac{2}{3}+\frac{3}{5}=\frac{21+20+18}{30}=1\frac{29}{30}$$

4

$$\begin{array}{rcr} 2\frac{3}{4} & = & 2\frac{15}{20} \\ 4\frac{4}{5} & = & 4\frac{16}{20} \\ \hline & & 7\frac{11}{20} \end{array}$$

5

$$\begin{array}{rcr} 5\frac{7}{9} & = & 5\frac{49}{63} \\ 3\frac{4}{7} & = & 3\frac{36}{63} \\ \hline & & 9\frac{22}{63} \end{array}$$

7

$$\begin{array}{rcr} 25\frac{11}{75} & = & 25\frac{22}{150} \\ 1\frac{17}{30} & = & 1\frac{85}{150} \\ \hline & & 26\frac{107}{150} \end{array}$$

9

$$\begin{array}{rcr} \frac{7}{20} & = & \frac{105}{300} \\ 8\frac{1}{150} & = & 8\frac{2}{300} \\ \hline & & 8\frac{107}{300} \end{array}$$

11

$$\begin{array}{rcr} 8\frac{5}{8} & = & 8\frac{45}{72} \\ 6\frac{7}{9} & = & 6\frac{56}{72} \\ 27\frac{2}{3} & = & 27\frac{48}{72} \\ \hline & & 43\frac{5}{72} \end{array}$$

10

$$\begin{array}{rcr} 241\frac{5}{12} & = & 241\frac{25}{60} \\ 4\frac{2}{3} & = & 4\frac{40}{60} \\ \frac{3}{5} & = & \frac{36}{60} \\ \hline & & 246\frac{41}{60} \end{array}$$

12

$$\begin{array}{rcr} 3\frac{1}{9} & = & 3\frac{35}{315} \\ & & 5 \\ 10\frac{2}{35} & = & 10\frac{18}{315} \\ \hline & & 18\frac{53}{315} \end{array}$$

14

$$\begin{array}{rlcrl} 60\frac{11}{40} & \text{mi.} & = & 60\frac{22}{80} & \text{mi.} \\ 75\frac{7}{8} & \text{"} & = & 75\frac{70}{80} & \text{"} \\ 110\frac{9}{16} & \text{"} & = & 110\frac{45}{80} & \text{"} \\ \hline & & & 246\frac{57}{80} & \text{"} \end{array}$$

15

$$\begin{array}{rcr} \$\,4\frac{4}{5} & = & \$\,4\frac{160}{200} \\ & & 23 \\ 6\frac{7}{8} & = & 6\frac{175}{200} \\ \frac{19}{20} & = & \frac{190}{200} \\ 55\frac{17}{100} & = & 55\frac{34}{200} \\ \hline & & \$90\frac{159}{200} \end{array}$$

13

$$\frac{11}{12}\text{ yd.}+\frac{17}{18}\text{ yd.}+\frac{1}{9}\text{ yd.}+\frac{35}{36}\text{ yd.}+\frac{1}{4}\text{ yd.}+\frac{3}{8}\text{ yd.}+\frac{7}{16}\text{ yd.}=$$
$$\frac{132+136+16+140+36+54+63}{144}\text{ yd.}=4\frac{1}{144}\text{ yd.}$$

Page 168.

1. $\frac{3}{4}\text{ A.}+\frac{1}{3}\text{ A.}+\frac{3}{5}\text{ A.}=\frac{45+20+36}{60}\text{ A.}=1\frac{41}{60}\text{ A.}$

2

$$\begin{array}{rlcrl} 1\frac{3}{20} & \text{T.} & = & 1\frac{6}{40} & \text{T.} \\ & & & \frac{37}{40} & \text{"} \\ \hline & & & 2\frac{3}{40} & \text{"} \end{array}$$

5

$$\begin{array}{rcr} 3\frac{3}{4} & = & 3\frac{63}{84} \\ 5\frac{5}{6} & = & 5\frac{70}{84} \\ 6\frac{6}{7} & = & 6\frac{72}{84} \\ \hline & & 16\frac{37}{84} \end{array}$$

8

$$\begin{array}{rcr} 10\frac{1}{10} & = & 10\frac{6}{60} \\ 8\frac{1}{5} & = & 8\frac{12}{60} \\ 27\frac{1}{20} & = & 27\frac{3}{60} \\ 14\frac{1}{15} & = & 14\frac{4}{60} \\ \hline & & 59\frac{5}{12} \end{array}$$

3

$$\frac{7}{10}+\frac{2}{3}+\frac{3}{4}=\frac{42+40+45}{60}=2\frac{7}{60}$$

4

$$\frac{7}{25}+\frac{17}{15}+\frac{221}{225}=\frac{63+255+221}{225}=2\frac{89}{225}$$

6

$$\frac{87}{144}+\frac{7}{12}+\frac{17}{24}+\frac{11}{12}=\frac{87+84+102+132}{144}=2\frac{13}{16}$$

7

$$\frac{7}{8}+\frac{9}{10}+\frac{11}{12}+\frac{14}{15}=\frac{105+108+110+112}{120}=3\frac{5}{8}$$

9

$$\frac{1}{10}+\frac{1}{4}+\frac{1}{2}+\frac{3}{20}=\frac{2+5+10+3}{20}=1\text{, entire salary.}$$

10

$$\$\frac{3}{10}+\$\frac{7}{20}+\$\frac{63}{100}+\$\frac{2}{5}+\$\frac{1}{2}=$$
$$\$\frac{30+35+63+40+50}{100}=\$2\frac{9}{50}$$

Page 168.

11

$$\begin{array}{rcrl} & & \frac{77}{128} & \text{cd.} \\ 3\frac{1}{8} \text{ cd.} & = & 3\frac{16}{128} & \text{"} \\ 1\frac{1}{16} \text{ "} & = & 1\frac{8}{128} & \text{"} \\ \frac{63}{64} \text{ "} & = & \frac{126}{128} & \text{"} \\ \hline & & 5\frac{99}{128} & \text{"} \end{array}$$

14

$$\begin{array}{rcr} 3\frac{4}{7} & = & 3\frac{520}{910} \\ & & 14 \\ 5\frac{3}{13} & = & 5\frac{210}{910} \\ \frac{1}{5} & = & \frac{182}{910} \\ 4\frac{1}{2} & = & 4\frac{455}{910} \\ \hline & & 27\frac{457}{910} \end{array}$$

15

$$\begin{array}{rcr} 19\frac{3}{4} & = & 19\frac{45}{60} \\ \frac{7}{15} & = & \frac{28}{60} \\ 65\frac{4}{5} & = & 65\frac{48}{60} \\ \frac{8}{15} & = & \frac{32}{60} \\ & & 23 \\ \hline & & 109\frac{11}{20} \end{array}$$

12

$$\tfrac{3}{16} + \tfrac{8}{9} + \tfrac{87}{64} + \tfrac{99}{128} = \frac{216+1024+1566+891}{1152} = 3\tfrac{241}{1152}$$

13

$$\tfrac{28}{40} + \tfrac{25}{200} + \tfrac{405}{729} = \frac{102060+18225+81000}{145800} = 1\tfrac{137}{360}$$

16

$$\begin{array}{llr} \text{From A to B is } 27\frac{3}{16} \text{ mi.} & = & 27\frac{30}{160} \text{ mi.} \\ \text{" B " C "} & & 30 \text{ "} \\ \text{" C " D " } 51\frac{13}{40} \text{ mi.} & = & 51\frac{52}{160} \text{ "} \\ \text{" D " E "} & & 32\frac{17}{160} \text{ "} \\ \hline \text{" A " E "} & & 140\frac{99}{160} \text{ "} \end{array}$$

17

$$\begin{array}{rcrl} 37\frac{4}{9} \text{ yd.} & = & 37\frac{32}{72} & \text{yd.} \\ 49\frac{5}{8} \text{ "} & = & 49\frac{45}{72} & \text{"} \\ 50\frac{3}{4} \text{ "} & = & 50\frac{54}{72} & \text{"} \\ \hline & & 137\frac{59}{72} & \text{"} \end{array}$$

SUBTRACTION.

Page 170.

1. $\frac{13}{15} - \frac{1}{2} = \frac{26-15}{30} = \frac{11}{30}$

2. $\frac{7}{11} - \frac{2}{9} = \frac{63-22}{99} = \frac{41}{99}$

3. $\frac{23}{25} - \frac{13}{15} = \frac{69-65}{75} = \frac{4}{75}$

4. $\frac{5}{14} - \frac{1}{6} = \frac{15-7}{42} = \frac{8}{42} = \frac{4}{21}$

5. $\frac{3}{11} - \frac{2}{17} = \frac{51-22}{187} = \frac{29}{187}$

6. $\frac{5}{14} - \frac{17}{99} = \frac{495-238}{1386} = \frac{257}{1386}$

7. $\frac{19}{20} - \frac{18}{19} = \frac{361-360}{380} = \frac{1}{380}$

8. $\frac{7}{8} - \frac{131}{160} = \frac{140-131}{160} = \frac{9}{160}$

9. $\frac{52}{119} - \frac{19}{102} = \frac{5304-2261}{12138} = \frac{179}{714}$

10

$$\tfrac{15}{16} \text{ mi.} - \tfrac{3697}{5280} \text{ mi.} = \frac{4950-3697}{5280} \text{ mi.} = \tfrac{1253}{5280} \text{ mi.}$$

11

$$\begin{array}{r} 99 \\ 75\frac{1}{4} \\ \hline 23\frac{3}{4} \end{array}$$

12

$$\begin{array}{r} 103 \\ 40\frac{7}{16} \\ \hline 62\frac{9}{16} \end{array}$$

13

$$\begin{array}{rcr} & & 108\frac{7}{40} \\ 9\frac{19}{20} & = & 9\frac{38}{40} \\ \hline & & 98\frac{9}{40} \end{array}$$

14

$$\begin{array}{rcr} 16\frac{7}{10} & = & 16\frac{77}{110} \\ 7\frac{8}{11} & = & 7\frac{80}{110} \\ \hline & & 8\frac{107}{110} \end{array}$$

15

$$\begin{array}{rcr} 45\frac{1}{2} & = & 45\frac{213}{426} \\ 45\frac{71}{213} & = & 45\frac{142}{426} \\ \hline & & \frac{71}{426} = \frac{1}{6} \end{array}$$

Page 170.

16

$19\frac{6}{7} = 19\frac{180}{210}$

$\frac{29}{30} = \frac{203}{210}$

$18\frac{187}{210}$

17

$21\frac{8}{33} = 21\frac{280}{1155}$

$15\frac{32}{35} = 15\frac{1056}{1155}$

$5\frac{379}{1155}$

18

$99\frac{9}{100} = 99\frac{891}{9900}$

$33\frac{17}{99} = 33\frac{1700}{9900}$

$65\frac{9091}{9900}$

19

$532\frac{23}{24} = 532\frac{2185}{2280}$

$235\frac{54}{95} = 235\frac{1296}{2280}$

$297\frac{889}{2280}$

Page 171.

1. $1\frac{11}{25} - \frac{24}{25} = \frac{36-24}{25} = \frac{12}{25}$

2. $\frac{25}{26} - \frac{25}{36} = \frac{450-325}{468} = \frac{125}{468}$

3

$1\frac{29}{135} = 1\frac{116}{540}$

$\frac{77}{84} = \frac{495}{540}$

$\frac{161}{540}$

4. $30 - \frac{7854}{10000} = \frac{300000-7854}{10000} = 29\frac{1073}{5000}$

5

$87\frac{12}{73}$

59

$28\frac{12}{73}$

6

$54\frac{1}{35}$

$27\frac{1}{34}$

$26\frac{1189}{1190}$

7

$\frac{9}{10}$ cd. $- \frac{27}{32}$ cd. $= \frac{144-135}{160}$ cd. $= \frac{9}{160}$ cd.

8

$\frac{17}{20}$ T. $- \frac{7}{16}$ T. $= \frac{68-35}{80}$ T. $= \frac{33}{80}$ T.

9

$4\frac{5}{13}$

$\frac{6}{7}$

$3\frac{48}{91}$

10

$25\frac{4}{17}$

$17\frac{4}{15}$

$7\frac{247}{255}$

11

$\frac{57}{131} - \frac{213}{579} = \frac{33003-27903}{75849} = \frac{1700}{25283}$

12

$\$5\frac{1}{4}$

$\frac{4}{5}$

$\$4\frac{9}{20}$

13

$18\frac{11}{320}$ mi.

$2\frac{9}{64}$ "

$15\frac{143}{160}$ "

14

$37\frac{3}{8}$ yd.

$1\frac{5}{6}$ "

$35\frac{13}{24}$ "

15

$\frac{9}{32} - \frac{4}{15} = \frac{135-128}{480} = \frac{7}{480}$

16

$\frac{24}{40} - \frac{9}{32} = \frac{96-45}{160} = \frac{51}{160}$

17

$15\frac{3}{8}$

$\frac{24}{40}$

$14\frac{31}{40}$

18

$15\frac{3}{8}$

$9\frac{4}{13}$

$6\frac{7}{104}$

19

$9\frac{4}{13}$

$2\frac{1}{8}$

$7\frac{19}{104}$

20

$2\frac{1}{8}$

$\frac{13}{16}$

$1\frac{5}{16}$

21

$\frac{9}{10} - \frac{13}{16} = \frac{72-65}{80} = \frac{7}{80}$

22

$5\frac{1}{8}$

$\frac{9}{10}$

$4\frac{13}{80}$

23

$124\frac{3}{11}$

$5\frac{1}{3}$

$118\frac{31}{33}$

24

$124\frac{3}{11}$

$19\frac{15}{396}$

$105\frac{31}{132}$

25

$\frac{19}{20}$ A. $= \frac{190}{200}$ A. in the lot;

$\frac{9}{25}$ " $+ \frac{1}{8}$ A. $= \frac{97}{200}$ " sold;

I had left $\frac{93}{200}$ "

26. $\frac{3}{8} + \frac{5}{7} = \frac{21+40}{56} = 1\frac{5}{56}$

27 ***Page 172.***

$\frac{3+5}{5+5} = \frac{8}{10} = \frac{4}{5}$

$\frac{4}{5}$ is $\frac{1}{5}$ more than $\frac{3}{5}$; hence, the value of the fraction is increased by $\frac{1}{5}$.

28

$\frac{5}{7} + 3\frac{1}{2} = 4\frac{3}{14} = 4\frac{18}{84}$

$5\frac{1}{4} - 4\frac{1}{3} = \frac{11}{12} = \frac{77}{84}$

$3\frac{25}{84}$

29

$\frac{4}{5} + \frac{37}{90} = 1\frac{19}{90}$, sum;

$\frac{4}{5} - \frac{37}{90} = \frac{7}{18}$, difference;

$1\frac{19}{90} + \frac{7}{18} = 1\frac{3}{5}$, sum of sum and difference.

MULTIPLICATION.

Page 175.

1

$\frac{11}{12} \times \frac{13}{21} = \frac{11 \times 13}{12 \times 21} = \frac{143}{252}$

2

$\frac{4}{7} \times \frac{24}{25} = \frac{4 \times 24}{7 \times 25} = \frac{96}{175}$

3

$\frac{5}{6} \times \frac{12}{13} = \frac{5 \times 12}{6 \times 13} = \frac{60}{78} = \frac{10}{13}$

4

$\frac{23}{24}$ of $\frac{25}{26} = \frac{23 \times 25}{24 \times 26} = \frac{575}{624}$

5

$\frac{21}{72}$ of $\frac{35}{89} = \frac{21 \times 35}{72 \times 89} = \frac{735}{6408} = \frac{245}{2136}$

6

$\frac{14}{25}$ of $\frac{4}{7} = \frac{14 \times 4}{25 \times 7} = \frac{56}{175} = \frac{8}{25}$

7

$\frac{19}{27} \times \frac{31}{48} = \frac{19 \times 31}{27 \times 48} = \frac{589}{1296}$

8

$\frac{218}{427} \times \frac{103}{159} = \frac{218 \times 103}{427 \times 159} = \frac{22454}{67893}$

9

$\frac{9}{10} \times \frac{15}{33} = \frac{9 \times 15}{10 \times 33} = \frac{9}{22}$

10

$\frac{1}{3}$ of $\frac{2}{7}$ of $\frac{5}{9} = \frac{1 \times 2 \times 5}{3 \times 7 \times 9} = \frac{10}{189}$

11

$\frac{7}{12} \times \frac{5}{8} \times \frac{11}{16} = \frac{7 \times 5 \times 11}{12 \times 8 \times 16} = \frac{385}{1536}$

12

$\frac{2}{3}$ of $\frac{12}{15} \times \frac{15}{16} = \frac{2 \times 12 \times 15}{3 \times 15 \times 16} = \frac{1}{2}$

13

$\frac{5}{7} \times \frac{2}{3} \times \frac{21}{25} = \frac{2}{5}$

14

$\frac{5}{51} \times \frac{17}{35} \times \frac{27}{2} = \frac{9}{14}$

15

$\frac{5}{6} \times \frac{3}{8} \times \frac{1}{2} \times \frac{18}{25} = \frac{9}{80}$

16

$\frac{2}{19} \times \frac{57}{90} \times \frac{3}{10} = \frac{1}{50}$

17

$7\frac{1}{2} = \frac{15}{2}$; $\frac{15}{2} \times \frac{5}{7} \times \frac{8}{9} \times \frac{7}{15} \times \frac{27}{25} = \frac{12}{7} = 1\frac{5}{7}$

18. $\frac{16}{35} \times \frac{7}{24} \times \frac{1}{2} \times \frac{15}{1} = 1$

Page 176.

19

$\frac{4}{5}$ of $6\frac{2}{3}$ times $8 = \frac{4}{5} \times \frac{20}{3} \times \frac{8}{1} = 42\frac{2}{3}$

20

$3\frac{1}{8} \times \frac{11}{50} \times 16 = \frac{25}{8} \times \frac{11}{50} \times \frac{16}{1} = 11$

21

$32\frac{7}{52} = \frac{1671}{52}$

$\frac{13}{18} \times \frac{15}{1} \times \frac{1671}{52} = 348\frac{1}{8}$

22

$\frac{2}{3} \times \frac{4}{5} \times \frac{5}{6} \times \frac{12}{17}$ of a melon $= \frac{16}{51}$ of a melon.

23

He sold $\frac{8}{21}$ of $\frac{7}{16} = \frac{1}{6}$ of the factory.

24

$\frac{11}{16} \times \$2\frac{3}{8} = \frac{11}{16} \times \$\frac{19}{8} = \$1\frac{81}{128}$

25. $13\frac{3}{29} \times \frac{87}{480} \times 3$ A. $= \frac{380}{29} \times \frac{87}{480} \times \frac{3}{1}$ A. $= 7\frac{1}{8}$ A.

26. $17\frac{1}{4} \times 4\frac{2}{3}$ rd. $= \frac{69}{4} \times \frac{14}{3}$ rd. $= 80\frac{1}{2}$ rd.

Page 176; Article 200.

1

$17 \times \frac{5}{38} = \frac{85}{38} = 2\frac{9}{38}$

2

$12 \times \frac{16}{17} = \frac{192}{17} = 11\frac{5}{17}$

3

$13 \times \frac{15}{26} = \frac{15}{2} = 7\frac{1}{2}$

4

$36 \times \frac{17}{18} = 34$

5

$1{,}000 \times \frac{37}{100} = \frac{37000}{100} = 370$

6

$588 \times \frac{9}{659} = 8\frac{20}{659}$

7

$$\begin{array}{r} 34\frac{3}{28} \\ 7 \\ \hline 238\frac{3}{4} \end{array}$$

8

$$\begin{array}{r} 875\frac{4}{7} \\ 53 \\ \hline 30\frac{2}{7} \\ 2625 \\ 4375 \\ \hline 46{,}405\frac{2}{7} \end{array}$$

9

$75 \times \frac{9}{16}$ bu. $= 42\frac{3}{16}$ bu.

10

$26 \times \$1\frac{3}{8} = \$35\frac{3}{4}$

11

$54 \times \frac{7}{10}$ da. $= 37\frac{4}{5}$ da.

12

$$\begin{array}{r} \$\ \ 2\frac{4}{25} \\ 52 \\ \hline \$112\frac{8}{25} \end{array}$$

Page 177; Article 201.

1. $\frac{9}{88} \times 44 = \frac{9}{2} = 4\frac{1}{2}$

2. $\frac{45}{49} \times 98 = \frac{45}{2} = 90$

3. $\frac{7}{15} \times 57 = \frac{133}{5} = 26\frac{3}{5}$

4. $\frac{19}{20} \times 23 = \frac{437}{20} = 21\frac{17}{20}$

5

$$\begin{array}{r} \$\ 9 \\ 3\frac{3}{4} \\ \hline 6\frac{3}{4} \\ 27 \\ \hline \$33\frac{3}{4} \end{array}$$

6

$$\begin{array}{r} \$\ 3.50 \\ 7\frac{3}{8} \\ \hline 131\frac{1}{4} \\ 2450 \\ \hline \$25.81\frac{1}{4} \end{array}$$

7

$$\begin{array}{r} 4{,}765 \\ 13\frac{7}{25} \\ \hline 1334\frac{1}{5} \\ 14295 \\ 4765 \\ \hline 63{,}279\frac{1}{5} \end{array}$$

9

$\frac{7}{8}$ of 300 lb. $= \frac{2100}{8}$ lb. $= 262\frac{1}{2}$ lb.

10

$\frac{11}{16} \times 1{,}172$ lb. $= \frac{3223}{4}$ lb. $= 805\frac{3}{4}$ lb.

8

$$\begin{array}{r} 13{,}672 \\ 28\frac{3}{17} \\ \hline 2412\frac{12}{17} \\ 109376 \\ 27344 \\ \hline 385{,}228\frac{12}{17} \end{array}$$

11

$$\begin{array}{r} 12¢ \\ 81\frac{1}{4} \\ \hline 3 \\ 972 \\ \hline \$9.75 \end{array}$$

12

$$\begin{array}{r} 44¢ \\ 37\frac{5}{8} \\ \hline 27\frac{1}{2} \\ 308 \\ 132 \\ \hline \$16.55\frac{1}{2} \end{array}$$

13

$$\begin{array}{r} \$5.31 \\ 72\frac{5}{6} \\ \hline 442\frac{1}{2} \\ 1062 \\ 3717 \\ \hline \$386.74\frac{1}{2} \end{array}$$

14

$$\begin{array}{r} \$62.50 \\ 67\frac{37}{80} \\ \hline 2890\frac{5}{8} \\ 43750 \\ 37500 \\ \hline \$4{,}216.40\frac{5}{8} \end{array}$$

Article 202.

1

$\frac{4}{7} \times \frac{9}{20} \times \frac{15}{16} \times \frac{14}{17} \times \$\frac{34}{1} = \$\frac{27}{4} = \$6\frac{3}{4}$

2

$5\frac{1}{2} \times \$\frac{7}{8} = \frac{11}{2} \times \$\frac{7}{8} = \$\frac{77}{16} = \$4\frac{13}{16}$

Page 178.

3

$\frac{3}{4} \times \$\frac{3}{4} = \$\frac{9}{16}$

4

$\frac{5}{6} \times \$7\frac{7}{10} = \frac{5}{6} \times \$\frac{77}{10} = \$\frac{77}{12} = \$6\frac{5}{12}$

5

$66\frac{2}{3} \times \$.12\frac{1}{2} = \frac{200}{3} \times \$\frac{.25}{2} = \$8.33\frac{1}{3}$

6

$125\frac{3}{4} \times 5\frac{7}{8}¢ = \frac{503}{4} \times \frac{47}{8}¢ = \$7.38\frac{25}{32}$

7. $\frac{2}{3}$ of $\frac{3}{4}$ of 6 times $\$18\frac{3}{4} = \frac{2}{3} \times \frac{3}{4} \times \frac{6}{1} \times \$\frac{75}{4} = \$56\frac{1}{4}$

8

$\frac{7}{8} \times \frac{5}{9} \times \frac{11}{15} \times \frac{4}{21} \times \frac{27}{40} = \frac{11}{240}$

9

$15 \times \frac{32}{33}$ rd. $= 14\frac{6}{11}$ rd.

10. $\frac{2}{5} \times \frac{3}{4} \times \$12\frac{7}{8} = \frac{2}{5} \times \frac{3}{4} \times \$\frac{103}{8} = \$3\frac{69}{80}$

11. $6 \times \frac{1}{4}$ of $\$4\frac{3}{4} = \frac{6}{1} \times \frac{1}{4} \times \$\frac{19}{4} = \$\frac{57}{8} = \$7\frac{1}{8}$

12. $2\frac{3}{4} \times 13\frac{7}{30}$ mi. $= \frac{11}{4} \times \frac{397}{30}$ mi. $= 36\frac{47}{120}$ mi.

13

$\frac{1}{2} \times (\frac{1}{8} + \frac{1}{12} + \frac{1}{16} =) \frac{13}{48} = \frac{13}{96}$

14

The eggs cost $\frac{3}{4} \times \$\frac{3}{16} = \$\ \frac{9}{64}$
" flour " $\frac{1}{8} \times \$11 = \ 1\frac{3}{8}$
Total cost, $\$1\frac{33}{64}$

15

$(\frac{3}{4} \times \frac{7}{8}) - (\frac{2}{3} \times \frac{2}{5}) = \frac{21}{32} - \frac{4}{15} = \frac{187}{480}$

16

He sold $\frac{4}{5}$ of $\frac{2}{3} = \frac{8}{15}$ of the ship;
He then owned $\frac{2}{3} - \frac{8}{15} = \frac{2}{15}$ " "

17

$\frac{7}{8} \times \$4.50 = \$3.93\frac{3}{4}$, cost of $\frac{7}{8}$ yd.
$\frac{3}{6} \times \ 3.75 = \ 1.87\frac{1}{2}$, " " $\frac{3}{6}$ "
$\frac{7}{8}$ yd. cost $\$2.06\frac{1}{4}$ more than $\frac{3}{6}$ yd.

18

$10 \times 11\frac{1}{4}¢ = \$1.12\frac{1}{2}$, cost of sugar;
$5 \times 87\frac{1}{2}¢ = \ 4.37\frac{1}{2}$, " " tea.
I expended $5.50

19. $8\frac{11}{16} \times \$\frac{3}{20} = \frac{139}{16} \times \$\frac{3}{20} = \$\frac{417}{320} = \$1\frac{97}{320}$

20

$12 \times 40\frac{1}{4}$ yd. = 483 yd. in the 12 pieces;
$48 \times \ 5\frac{3}{8}$ " = 258 " " 48 suits;
225 " left.

DIVISION.

Page 182.

1

$\frac{11}{14} \div \frac{8}{9} = \frac{11}{14} \times \frac{9}{8} = \frac{99}{112}$

2

$\frac{19}{20} \div \frac{7}{8} = \frac{19}{20} \times \frac{8}{7} = \frac{38}{35} = 1\frac{3}{35}$

3

$\frac{10}{67} \div 12\frac{2}{11} = \frac{10}{67} \times \frac{11}{134} = \frac{55}{4489}$

4

$\frac{52}{10000} \div \frac{13}{100} = \frac{52}{10000} \times \frac{100}{13} = \frac{1}{25}$

5

$\frac{17}{24} \div 3\frac{2}{5} = \frac{17}{24} \times \frac{5}{17} = \frac{5}{24}$

6

$5\frac{3}{7} \div \frac{3}{8} = \frac{38}{7} \times \frac{8}{3} = \frac{304}{21} = 14\frac{10}{21}$

7

$7\frac{1}{5} \div \frac{6}{7} = \frac{36}{5} \times \frac{7}{6} = \frac{42}{5} = 8\frac{2}{5}$

8

$1\frac{1}{15} \div \frac{4}{5} = \frac{16}{15} \times \frac{5}{4} = \frac{4}{3} = 1\frac{1}{3}$

9

$5\frac{3}{10} \div \frac{7}{16} = \frac{53}{10} \times \frac{16}{7} = \frac{424}{35} = 12\frac{4}{35}$

10

$7\frac{7}{11} \div 6\frac{3}{10} = \frac{84}{11} \times \frac{10}{63} = \frac{40}{33} = 1\frac{7}{33}$

11

$16\frac{4}{5} \div 10\frac{1}{2} = \frac{84}{5} \times \frac{2}{21} = \frac{8}{5} = 1\frac{3}{5}$

12

$3\frac{1}{4} \div 10\frac{2}{5} = \frac{13}{4} \times \frac{5}{52} = \frac{5}{16}$

13

$10\frac{1}{2} \div 16\frac{4}{5} = \frac{21}{2} \times \frac{5}{84} = \frac{5}{8}$

14

$3\frac{1}{5} \div 4\frac{2}{3} = \frac{16}{5} \times \frac{3}{14} = \frac{24}{35}$

15

$13 \div 7\frac{4}{5} = \frac{13}{1} \times \frac{5}{39} = 1\frac{2}{3}$

16

$20\frac{3}{4} \div 8\frac{1}{5} = \frac{83}{4} \times \frac{5}{41} = 2\frac{87}{164}$

17

$40\frac{5}{9} \div 5\frac{4}{9} = \frac{365}{9} \times \frac{9}{49} = 7\frac{22}{49}$

18

$25 \div \frac{7}{12} = \frac{25}{1} \times \frac{12}{7} = 42\frac{6}{7}$

19

$5\frac{1}{4}$ bu. $=$ $5\frac{1}{4}$ sq. yd. at 1 bu. per sq. yd.;
$5\frac{1}{4}$ sq. yd. $\div \frac{1}{12} = \frac{21}{4}$ sq. yd. $\times \frac{12}{1} = 63$ sq. yd.

Page 183.

20

$\$\frac{39}{50} \div 8\frac{2}{3} = \$\frac{39}{50} \times \frac{3}{26} = \$\frac{9}{100}$ per qt.

21

$738\frac{3}{10}$ h. $=$ $738\frac{3}{10}$ da. at 1 hour per day;
$738\frac{3}{10}$ da. $\div 9\frac{1}{5} = \frac{7383}{10}$ da. $\times \frac{5}{46} = 80\frac{1}{4}$ da.

Page 183; Article 205.

1

$\frac{6}{7} \div 7 = \frac{6}{7} \times \frac{1}{7} = \frac{6}{49}$

2

$\frac{9}{11} \div 5 = \frac{9}{11} \times \frac{1}{5} = \frac{9}{55}$

3

$\frac{24}{35} \div 16 = \frac{24}{35} \times \frac{1}{16} = \frac{3}{70}$

4

$\frac{3825}{4371} \div 25 = \frac{3825}{4371} \times \frac{1}{25} = \frac{51}{1457}$

5

$2\frac{4}{5} \div 8 = \frac{14}{5} \times \frac{1}{8} = \frac{7}{20}$

6

$8\frac{2}{9} \div 37 = \frac{74}{9} \times \frac{1}{37} = \frac{2}{9}$

7

$15\frac{1}{8} \div 18 = \frac{121}{8} \times \frac{1}{18} = \frac{121}{144}$

8

$41\frac{5}{7} \div 9 = \frac{292}{7} \times \frac{1}{9} = 4\frac{40}{63}$

9

$23\,)\,400\frac{7}{12}\,(\,17\frac{5}{12}$
23
$\overline{170}$
161
$\overline{(9\frac{7}{12} =)\,\frac{115}{12} \div 23 = \frac{5}{12}}$

10

$12\,)\,\underline{2{,}506\frac{3}{5}}$
$208\frac{10\frac{3}{5}}{12} = 208\frac{53}{60}$

11

$2|0\,)\,\underline{2{,}00|0\frac{5}{7}}$
$100\frac{\frac{5}{7}}{20} = 100\frac{1}{28}$

12

$27\,)\,5{,}678\frac{9}{10}\,(\,210\frac{89}{270}$
54
$\overline{27}$
27
$\overline{\frac{8\frac{9}{10}}{27} = \frac{89}{270}}$

13

$\frac{5}{6}$ T. $\div 15 = \frac{5}{6}$ T. $\times \frac{1}{15} = \frac{1}{18}$ T.

14

$\frac{4}{5}$ T. $\div 8 = \frac{4}{5}$ T. $\times \frac{1}{8} = \frac{1}{10}$ T.

15

$4\frac{3}{8}$ lb. $\div 9 = \frac{35}{8}$ lb. $\times \frac{1}{9} = \frac{35}{72}$ lb.

16

$22\frac{1}{2}$ lb. $\div 72 = \frac{45}{2}$ lb. $\times \frac{1}{72} = \frac{5}{16}$ lb.

17

$\$27\frac{3}{5} \div 18 = \$\frac{138}{5} \times \frac{1}{18} = \$1\frac{8}{15}$

18

$11\,)\,\underline{1{,}758\frac{7}{8}}$ lb.
$159\frac{79}{88}$ "

Article 206.

1

$12 \div \frac{7}{9} = \frac{12}{1} \times \frac{9}{7} = \frac{108}{7} = 15\frac{3}{7}$

2

$9 \div \frac{2}{9} = \frac{9}{1} \times \frac{9}{2} = \frac{81}{2} = 40\frac{1}{2}$

3

$153 \div \frac{8}{11} = \frac{153}{1} \times \frac{11}{8} = \frac{1683}{8} = 210\frac{3}{8}$

4

$62 \div \frac{38}{45} = \frac{62}{1} \times \frac{45}{38} = \frac{1395}{19} = 73\frac{8}{19}$

5

$18 \div 10\frac{1}{2} = \frac{18}{1} \times \frac{2}{21} = 1\frac{5}{7}$

6

$80 \div 2\frac{1}{7} = \frac{80}{1} \times \frac{7}{15} = 37\frac{1}{3}$

7

$625 \div 6\frac{1}{4} = \frac{625}{1} \times \frac{4}{25} = 100$

8

$8 \div 2\frac{4}{5} = \frac{8}{1} \times \frac{5}{14} = 2\frac{6}{7}$

Page 183.

9

$\$41 \div \frac{3}{4} = \$\frac{41}{1} \times \frac{4}{3} = \$54\frac{2}{3}$

10

16 h. $\div 7\frac{2}{3} = \frac{16}{1}$ h. $\times \frac{3}{23} = 2\frac{2}{23}$ h.

11

28 yd. $\div 5\frac{2}{9} = \frac{28}{1}$ yd. $\times \frac{9}{47} = 5\frac{17}{47}$ yd.

12

84 doz. $\div 1\frac{5}{12} = \frac{84}{1}$ doz. $\times \frac{12}{17} = 59\frac{5}{17}$ doz.

Page 184.

13

\$15 = 15 pairs of shoes at \$1 per pr.
15 pr. $\div \frac{5}{8} = \frac{15}{1}$ pr. $\times \frac{8}{5} = 24$ pairs.

14

\$24 = 24 yd. of silk at \$1 per yd.
24 yd. $\div \frac{17}{25} = \frac{24}{1}$ yd. $\times \frac{25}{17} = 35\frac{5}{17}$ yd.

15

24 ft. = 24 blocks each 1 ft. long.
24 blocks $\div \frac{3}{4} = \frac{24}{1}$ blocks $\times \frac{4}{3} = 32$ blocks.

16

93 bu. $\div 4\frac{1}{2} = \frac{93}{1}$ bu. $\times \frac{2}{9} = 20\frac{2}{3}$ bu.

17

36 pp. $\div 6\frac{2}{5} = \frac{36}{1}$ pp. $\times \frac{5}{32} = 5\frac{5}{8}$ pp.

18

5,280 ft. = 5,280 steps of 1 ft. each.
$5{,}280$ steps $\div 2\frac{1}{2} = 5{,}280$ steps $\times \frac{2}{5} = 2{,}112$ steps.

19

$\$423 \div 18\frac{4}{5} = \$\frac{423}{1} \times \frac{5}{94} = \$22\frac{1}{2}$

20

$\$1{,}500 \div 2{,}707\frac{1}{2} = \$\frac{1500}{1} \times \frac{2}{5415} = \$\frac{200}{361}$

Article 207.

1

$\frac{11}{25} \div 9 = \frac{11}{25} \times \frac{1}{9} = \frac{11}{225}$

2

$29 \div \frac{4}{7} = \frac{29}{1} \times \frac{7}{4} = 50\frac{3}{4}$

3

$200\frac{1}{11} \div 5 = \frac{2201}{11} \times \frac{1}{5} = 40\frac{1}{55}$

4

$360 \div 12\frac{6}{7} = \frac{360}{1} \times \frac{7}{90} = 28$

5

$\frac{27}{32} \div 18\frac{7}{10} = \frac{27}{32} \times \frac{10}{187} = \frac{135}{2992}$

6

$1{,}811\frac{7}{15} \div \frac{17}{75} = \frac{27172}{15} \times \frac{75}{17} = 7{,}991\frac{13}{17}$

7

$\frac{12}{13} \div \frac{6}{65} = \frac{12}{13} \times \frac{65}{6} = 10$

8

$3\frac{1}{27} \div 45\frac{5}{9} = \frac{82}{27} \times \frac{9}{410} = \frac{1}{15}$

Page 184.

9

$\frac{5}{8}$ yd. $\div 9 = \frac{5}{8}$ yd. $\times \frac{1}{9} = \frac{5}{72}$ yd.

10

$22\frac{3}{5}$ A. $\div 7 = \frac{113}{5}$ A. $\times \frac{1}{7} = 3\frac{8}{35}$ A.

11

\$11 = 11 qt. at \$1 per qt.
11 qt. $\div \frac{2}{5} = \frac{11}{1}$ qt. $\times \frac{5}{2} = 27\frac{1}{2}$ qt.

12

$3\frac{2}{3}$ cd. $\div 15 = \frac{11}{3}$ cd. $\times \frac{1}{15} = \frac{11}{45}$ cd.

Page 185.

13

\$$\frac{5}{8} = \frac{5}{8}$ lb. at \$1 per lb.
$\frac{5}{8}$ lb. $\div \frac{2}{3} = \frac{5}{8}$ lb. $\times \frac{3}{2} = \frac{15}{16}$ lb.

14

\$$\frac{11}{12} = \frac{11}{12}$ bu. at \$1 per bu.
$\frac{11}{12}$ bu. $\div 5\frac{1}{3} = \frac{11}{12}$ bu. $\times \frac{3}{16} = \frac{11}{64}$ bu.

15

$\frac{9}{20}$ lb. $\div 12 = \frac{9}{20}$ lb. $\times \frac{1}{12} = \frac{3}{80}$ lb.

16

33 rd. = 33 da. at 1 rod per da.
33 da. $\div 4\frac{2}{5} = \frac{33}{1}$ da. $\times \frac{5}{22} = 7\frac{1}{2}$ da.

17

\$$\frac{21}{50} = \frac{21}{50}$ lb. at \$1 per lb.
$\frac{21}{50}$ lb. $\div \frac{7}{8} = \frac{21}{50}$ lb. $\times \frac{8}{7} = \frac{12}{25}$ lb.

18

\$12 = 12 da. at \$1 per da.
12 da. $\div 2\frac{1}{4} = \frac{12}{1}$ da. $\times \frac{4}{9} = 5\frac{1}{3}$ da.

19

$22\frac{1}{2}$ mi. = $22\frac{1}{2}$ min. at 1 mi. per min.
$22\frac{1}{2}$ min. $\div \frac{9}{14} = \frac{45}{2}$ min. $\times \frac{14}{9} = 35$ min.

20

\$$\frac{22}{25} \div 14\frac{2}{3} = $\$$\frac{22}{25} \times \frac{3}{44} = $\$$\frac{3}{50}$

21

$13\frac{15}{32}$ A. = $13\frac{15}{32}$ da. at 1 A. per da.
$13\frac{15}{32}$ da. $\div \frac{7}{8} = \frac{431}{32}$ da. $\times \frac{8}{7} = 15\frac{11}{28}$ da.

22

\$$1\frac{9}{16} \div 12\frac{1}{2} = $\$$\frac{25}{16} \times \frac{2}{25} = $\$$\frac{1}{8}$

23. $23\frac{7}{32}$ T. $\div 9\frac{3}{8} = \frac{743}{32}$ T. $\times \frac{8}{75} = 2\frac{143}{300}$ T.

24. $(\frac{7}{12} \times 2\frac{5}{8}) \div (\frac{5}{8} \times 8\frac{3}{4}) = \frac{49}{32} \times \frac{32}{175} = \frac{7}{25}$

25. $(\frac{3}{8} \times 3\frac{1}{5}) \div (7\frac{1}{2} \times 15) = \frac{6}{5} \times \frac{2}{225} = \frac{4}{375}$

26. $(15\frac{2}{7} \times 4\frac{2}{3}) \div (24\frac{1}{2} \times \frac{3}{7} \times 7\frac{2}{7}) = \frac{214}{3} \times \frac{2}{153} = \frac{428}{459}$

27. $(2\frac{7}{8} \times 1\frac{11}{69}) \div (\frac{3}{7} \times \frac{5}{18} \times 2\frac{1}{10}) = \frac{10}{3} \times \frac{4}{1} = 13\frac{1}{3}$

28. $(\frac{5}{6} \times 3\frac{3}{5}) \div (\frac{7}{45} \times 8\frac{1}{10}) = \frac{3}{1} \times \frac{50}{63} = 2\frac{8}{21}$

29. $(7\frac{1}{12} \times \frac{8}{17} \times \frac{6}{25}) \div (7\frac{1}{7} \times 1\frac{24}{25}) = \frac{4}{5} \times \frac{1}{14} = \frac{2}{35}$

30. $(\frac{5}{7} - \frac{5}{9}) \div (\frac{5}{7} + \frac{5}{9}) = \frac{10}{63} \times \frac{63}{80} = \frac{1}{8}$

31. $(16 \div 24\frac{4}{5}) \div (12\frac{2}{5} \div 18) = \frac{20}{31} \times \frac{45}{31} = \frac{900}{961}$

32

$(9\frac{3}{5} \times \frac{15}{8}) + (\frac{6}{11} \times 2\frac{1}{5} \times 75) = 18 + 90 = 108$; $108 \div (90 - 18 =)\ 72 = 1\frac{1}{2}$

GENERAL REVIEW PROBLEMS IN FRACTIONS.

Page 187.

1

$85 \div 17 = 5;\ \frac{3 \times 5}{17 \times 5} = \frac{15}{85}$

$153 \div 17 = 9;\ \frac{3 \times 9}{17 \times 9} = \frac{27}{153}$

2

$\frac{13293}{47} = 13,293 \div 47 = 282\frac{39}{47}$

$\frac{37419}{83} = 37,419 \div 83 = 450\frac{69}{83}$

$\frac{42763}{234} = 42,763 \div 234 = 182\frac{175}{234}$

3

$\frac{4 \times 5 \times 9}{7 \times 5 \times 9} = \frac{180}{315}$

$\frac{4 \times 7 \times 9}{5 \times 7 \times 9} = \frac{252}{315}$

$\frac{4 \times 7 \times 5}{9 \times 7 \times 5} = \frac{140}{315}$

4

$357\frac{5}{16} = 357\frac{15}{48}$

$256\frac{5}{6} + \frac{11}{12} = 257\frac{18}{24} = \underline{257\frac{36}{48}}$

$99\frac{27}{48}$

5

Minuend, $103\frac{5}{7} = 103\frac{15}{21}$

Remainder, $21\frac{2}{3} = \underline{21\frac{14}{21}}$

Subtrahend, $82\frac{1}{21}$

6. $23\frac{1}{15} \times 335 = 7,727\frac{1}{3}$

7

$\frac{7}{12}$ of $1\frac{5}{7} = \frac{7}{12} \times \frac{12}{7} = 1$, dividend;

$\frac{5}{9}$ of $87\frac{3}{4} = \frac{5}{9} \times \frac{351}{4} = \frac{195}{4}$, divisor;

$1 \div \frac{195}{4} = 1 \times \frac{4}{195} = \frac{4}{195}$, quotient.

8

$\$3\frac{17}{20} \div 13\frac{3}{4} = \$\frac{77}{20} \div \frac{55}{4} = \$\frac{7}{25}$ per doz.

$11\frac{2}{3} \times \$\frac{7}{25} = \frac{35}{3} \times \$\frac{7}{25} = \$3\frac{4}{15}$ for $11\frac{2}{3}$ doz.

9

$15\frac{1}{2} \times 10\frac{1}{2}¢ = \frac{651}{4}¢$ for the sugar.

$\frac{651}{4}¢ = \frac{651}{4}$ lb. at 1¢ per lb.

$\frac{651}{4}$ lb. $\div 18\frac{3}{4} = 8\frac{17}{25}$ lb. of butter.

10

After selling $\frac{2}{5}$ of his land he had $\frac{5}{5} - \frac{2}{5} = \frac{3}{5}$ of it.

$112\frac{2}{20}$ A. $- 37\frac{3}{4}$ A. $= 74\frac{7}{20}$ A. $= \frac{3}{5}$ of his land at first; and

$74\frac{7}{20}$ A. $\div \frac{3}{5} = 123\frac{11}{12}$ A. at first.

11

$\frac{7}{8} \times \frac{1}{2} \times 42\frac{2}{3} \div \frac{1}{6} \times \frac{4}{9} \times \frac{27}{1} = \frac{7}{8} \times \frac{1}{2} \times \frac{128}{3} \times \frac{6}{1} \times \frac{9}{4} \times \frac{1}{27} = 9\frac{1}{3}$

12

I sold $\frac{3}{7} \times \frac{3}{4} = \frac{9}{28}$ of the whole farm;

$\$3,405 \div \frac{9}{28} = \$10,593\frac{1}{3}$, value of the farm.

Page 187.

13

$\$\frac{7}{8} \div \frac{7}{9} \times 16\frac{1}{2} = \$\frac{7}{8} \times \frac{9}{7} \times \frac{33}{2} = \$18\frac{9}{16}$

14

1 hhd. $- \left(\frac{1}{8} + \frac{2}{5} + \frac{3}{20} + \frac{1}{4} = \right) \frac{37}{40}$ hhd. $= \frac{3}{40}$ hhd. $= 102$ lb
102 lb. $\div \frac{3}{40} = 1{,}360$ lb. in the hhd.

15

In 52 weeks she earns $52 \times 6 \times \$\frac{7}{8} = \$273$
" 52 " " expends $52 \times \$3\frac{3}{4} = 195$
She saves $\$78$

16

$\frac{7}{8}$ of $3\frac{1}{3}$ T. @ $\frac{2}{3}$ of $\$8\frac{5}{8} = \frac{7}{8} \times \frac{10}{3} \times \frac{2}{3} \times \$\frac{69}{8} = \$16\frac{37}{48}$

17

$12)\frac{48}{84} = \frac{4}{7}$; $5)\frac{35}{215} = \frac{7}{43}$; $21)\frac{105}{441} = \frac{5}{21}$; $175)\frac{1575}{1225} = \frac{9}{7}$; $1323)\frac{11907}{17199} = \frac{9}{13}$

18

$\frac{9}{15}\frac{-4}{-4} = \frac{5}{11}$; $\frac{9}{15} - \frac{5}{11} = \frac{8}{55}$. Value diminished $\frac{8}{55}$ of 1.

Page 188.

19

$1 - \frac{1}{3}$ of $10\frac{1}{2} \times \frac{1}{14} = 1 - \frac{1}{3} \times \frac{21}{2} \times \frac{1}{14} = 1 - \frac{1}{4} = \frac{3}{4}$

20

$207\frac{2}{9} \div \left(10\frac{1}{8} \times 116\frac{10}{16} \times 3\frac{3}{8}\right) = 207\frac{2}{9} \div 4{,}329\frac{5}{64} = \frac{119360}{2493549}$

21

$\frac{4}{5} + \frac{2}{3} = 1\frac{7}{15}$, sum;
$\frac{4}{5} - \frac{2}{3} = \frac{2}{15}$, difference;
$\frac{4}{5} \times \frac{2}{3} = \frac{8}{15}$, product.

22

$2\frac{2}{5} + \frac{7}{9} = 3\frac{8}{45}$, sum;
$2\frac{2}{5} - \frac{7}{9} = 1\frac{28}{45}$, difference;
$2\frac{2}{5} \times \frac{7}{9} = 1\frac{13}{15}$, product.

23

$\frac{4}{7} + \frac{6}{11} = 1\frac{9}{77}$, sum;
$\frac{4}{7} - \frac{6}{11} = \frac{2}{77}$, difference;
$\frac{4}{7} \times \frac{6}{11} = \frac{24}{77}$, product.

24

$7\frac{2}{9} + 5\frac{1}{8} = 12\frac{25}{72}$, sum;
$7\frac{2}{9} - 5\frac{1}{8} = 2\frac{7}{72}$, difference;
$7\frac{2}{9} \times 5\frac{1}{8} = 37\frac{1}{72}$, product.

25

The quotient of $18\frac{1}{12}$ divided by $19\frac{3}{8}$ expresses the required part.
$18\frac{1}{12} \div 19\frac{3}{8} = \frac{217}{12} \div \frac{155}{8} = \frac{14}{15}$

26

165 is the common denominator of the given fractions.
$17\frac{1}{3} = \frac{52}{3} = \frac{2860}{165}$; $\frac{1}{5} \times \frac{9}{11} = \frac{9}{55} = \frac{27}{165}$; $\frac{12}{1} = \frac{1980}{165}$

Page 188.

27

$25\frac{7}{16}$ lb. + $29\frac{3}{4}$ lb. + $27\frac{1}{8}$ lb. = $82\frac{5}{16}$ lb., gross weight.
$5\frac{9}{16}$ lb. + $5\frac{3}{8}$ lb. + $7\frac{1}{2}$ lb. = $18\frac{7}{16}$ " of crocks.
$63\frac{7}{8}$ " " butter.
$63\frac{7}{8} \times 1\frac{1}{4}$ yd. = $79\frac{27}{32}$ yd.

28

$\frac{2}{3}$ of $17\frac{3}{4} = 11\frac{5}{6} = 11\frac{40}{48}$
$\frac{7}{12}$ of $18\frac{3}{4} = 10\frac{15}{16} = 10\frac{45}{48}$
Difference, $\frac{43}{48}$

32

B walked $7\frac{4}{15} \times 3\frac{7}{8}$ mi. = $28\frac{19}{120}$ mi.
A " $3\frac{1}{6} \times 4\frac{1}{5}$ " = $13\frac{36}{120}$ "
B walked the greater distance by $14\frac{103}{120}$ "

29

$\frac{3}{7}$ of 50 A. = $21\frac{3}{7}$ A. to corn;
$\frac{3}{4}$ of $(\frac{7}{7} - \frac{3}{7} =) \frac{4}{7}$ of 50 A. = $21\frac{3}{7}$ A. " potatoes;
$\frac{7}{7} - (\frac{3}{7} + \frac{3}{7} =) \frac{6}{7} = \frac{1}{7}$ of 50 A. = $7\frac{1}{7}$ A. " wheat.

30

1 boot in $\frac{1}{3}$ da. = 3 boots per da.
1 " " $\frac{2}{3}$ " = $\frac{1}{2}$ of 3 boots = $1\frac{1}{2}$ boots per da.
1 " " $\frac{1}{5}$ " = 5 boots per da.
1 " " $\frac{3}{5}$ " = $\frac{1}{3}$ of 5 boots = $1\frac{2}{3}$ " " "
Total, $3\frac{1}{6}$ " " "

31

$11\frac{3}{8}$ lb. − $\frac{2}{7}$ of $11\frac{3}{8}$ lb. = $8\frac{1}{8}$ lb., dressed weight.
$11\frac{3}{8} \times \$.12 = \$1.36\frac{1}{2}$, cost.
$\$1.36\frac{1}{2} \div 8\frac{1}{8} = \$.16\frac{1}{17}$ per lb.

33

$$\frac{\$31.25}{26 \times 10} \times \frac{12 \times 19}{1} = \$27.40\frac{5}{13}$$

34

$\frac{9}{1} \times 1\frac{2}{3} \div 2\frac{2}{9} = \frac{9}{1} \times \frac{5}{3} \times \frac{9}{20} = \frac{27}{4}$, first factor.
$\frac{1}{2}$ of $1\frac{1}{5} \div (\frac{2}{7} - \frac{2}{9} =) \frac{4}{63} = \frac{1}{2} \times \frac{6}{5} \times \frac{63}{4} = \frac{189}{20}$, second "
$\frac{27}{4} \times \frac{189}{20} = \frac{5103}{80}$, product.
$\frac{27}{4} + \frac{189}{20} = \frac{324}{20}$, sum.
$\frac{5103}{80} \div \frac{324}{20} = \frac{63}{16} = 3\frac{15}{16}$, quotient.

35

$\frac{1}{3}$ of his money = 1st payment.
$\frac{1}{3} \times (\frac{3}{3} - \frac{1}{3} =) \frac{2}{3} = \frac{2}{9}$ " " = 2d "
$\frac{1}{5} \times \frac{2}{3} \times [\frac{9}{9} - (\frac{1}{3} + \frac{2}{9} =) \frac{5}{9} =] \frac{4}{9} = \frac{8}{135}$ " " = 3d "
$1 - (\frac{1}{3} + \frac{2}{9} + \frac{8}{135} =) \frac{83}{135} = \frac{52}{135}$ " " left.

CHAPTER V.

COMPOUND NUMBERS.—MEASURES.

Page 192.

1

5 mi. 187 rd. 2 yd. 1 ft. 9 in.
5 × 320 rd. + 187 rd. = 1,787 rd.
1,787 × 5½ yd. + 2 yd. = 9,830½ yd.
9,830½ × 3 ft. + 1 ft. = 29,492½ ft.
29,492½ × 12 in. + 9 in. = 353,919 in.
Hence, 5 mi. 187 rd. 2 yd. 1 ft. 9 in. = 353,919 in.

2

25 sq. rd. 3 sq. yd. 8 sq. ft.
25 × 30¼ sq. yd. + 3 sq. yd. = 759¼ sq. yd.
759¼ × 9 sq. ft. + 8 sq. ft. = 6,841¼ sq. ft.
6,841¼ × 144 sq. in. = 985,140 sq. in.
Hence, 25 sq. rd. 3 sq. yd. 8 sq. ft. = 985,140 sq. in.

3

63 rd. 4 yd. 2 ft.
63 × 5½ yd. + 4 yd. = 350½ yd.
350½ × 3 ft. + 2 ft. = 1,053½ ft.
Hence, 63 rd. 4 yd. 2 ft. = 1,053½ ft.

4

84 sq. rd. 4 sq. ft.
84 × 272¼ sq. ft. + 4 sq. ft. = 22,873 sq. ft.
Hence, 48 sq. rd. 4 sq. ft. = 22,873 sq. ft.

REMARK.—The solutions of the preceding problems—1, 2, 3, 4—are mathematically and logically correct. The forms of the solutions of the remaining six problems are those in common use.

5

275 bu. 3 pk. 7 qt.
4
1,103 pk.
8
8,831 qt.

6

5 cu. yd. 848 cu. in.
27
135 cu. ft.
1728
234,128 cu. in.

7

42 yd. 3 qr.
4
171 qr.
9
1,539 in.

8

$34\frac{3}{16}$ sq. mi.
640
21,880 A.
160
3,500,800 sq. rd.

Page 192.

9

4.375 × 640 A. = 2,800 A.

10

$7\frac{5}{8}$ × 128 cu. ft. = 976 cu. ft.

Page 194.

1. 925 in. = $\frac{1}{12}$ of 925 ft. = 77 ft. 1 in.

2. 2,000 rd. = $\frac{1}{320}$ of 2,000 mi. = 6 mi. 80 rd.

3. $\left\{\begin{array}{l}\text{312,000 sq. rd.} = \frac{1}{160} \text{ of 312,000 A.} = \text{1,950 A.}\\ \text{1,950 A.} = \frac{1}{640} \text{ of 1,950 sq. mi.} = \text{3 sq. mi. 30 A.}\end{array}\right.$

4. (297 sq. ft. =) 297 sq. yd. ÷ 9 = 33 sq. yd.

See remark on preceding page.

5

5.5) 398 yd.
72 rd. 2 yd.

6

32) 17,283 qt.
540 bu. 3 qt.

7

2) 1,535 pt.
4) 767 qt. 1 pt.
191 gal. 3 qt.

Hence, 1,535 pt. = 191 gal. 3 qt. 1 pt.

8

64|0) 3,23|6 A.
5 sq. mi. 36 A.

9

1,728) 185,520 cu. in.
27) 107 cu. ft. 624 cu. in.
3 cu. yd. 26 cu. ft.

Hence, 185,520 cu. in. = 3 cu. yd. 26 cu. ft. 624 cu. in.

10

144) 334,976 sq. in.
9) 2,326 sq. ft. 32 sq. in.
30.25) 258 sq. yd. 4 sq. ft.
8 sq. rd. 16 sq. yd.

Hence, 334,976 sq. in. = 8 sq. rd. 16 sq. yd. 4 sq. ft. 32 sq. in.

11

1,728) 4,713,256 cu. in.
128) 2,727 cu. ft. 1,000 cu. in.
21 cd. 39 cu. ft.

Hence, 4,713,256 cu. in. = 21 cd. 39 cu. ft. 1,000 cu. in.

Page 194.

12

8) 3,825 qt.
4) 478 pk. 1 qt.
119 bu. 2 pk.
Hence, 3,825 qt. = 119 bu. 2 pk. 1 qt.

13

128) 2,469 cu. ft.
19 cd. 37 cu. ft.

14

2) 1,727 pt.
4) 863 qt. 1 pt.
215 gal. 3 qt.
Hence, 1,727 pt. = 215 " 3 " 1 pt.

Page 195.

1

1 mi. 68 rd. 2 yd.
320
388 rd.
5½
2,136 yd.
3
6,408 ft. = 6,408 tiles each 1 ft. long.

2

7 bu. 3 pk. 6 qt.
4
31 pk.
8
254 qt.
2
508 pt.

3

2 mi. 45 rd. = 685 rd., length of tract.
$\frac{7}{8}$ mi. = $\frac{7}{8}\times 320$ rd. = 280 " width " "
$(2\times 685$ rd.$) + (2\times 280$ rd.$) = 1,930$ " of fence.

4. 10 A. = 48,400 sq. yd.; hence, 48,400 hills.

5

6,386 trees = 6,386 sq. rd. at 1 tree per sq. rd.
16|0) 6,38|6 sq. rd.
39 A. 146 sq. rd.

6

8) 305 qt.
4) 38 pk. 1 qt.
9 bu. 2 pk.
Hence, 305 qt. = 9 bu. 2 pk. 1 qt.

7

10 gal. = 320 gi.
Hence, 320 bottles.

8

7 bu. 3 pk. 5 qt. 1 pt. = 507 pt.
Hence, 507 pt. papers.

9

365 qt. cans contain 365 qt.
4) 365 qt.
91 gal. 1 qt.

10

2) 353 pt.
8) 176 qt. 1 pt.
4) 22 pk.
5 bu. 2 pk.
Hence, 353 pt. = 5 bu. 2 pk. 1 pt.

Page 197.

4

4 yd. 2 ft. 4 in.
3 " 1 " 8 "
5 " 2 " 6 "
14 yd. 0 ft. 6 in.

5

20 gal. 2 qt.
15 " 1 "
14 " 0 " 0 pt. 3 gi.
49 gal. 3 qt. 0 pt. 3 gi.

6

13 bu.
12 " 3 pk.
19 " 0 " 2 qt.
36 " 2 " 2 "
81 bu. 1 pk. 4 qt.

7

5 cd. 60 cu. ft.
6 " 96 " "
9 " 68 " "
21 cd. 96 cu. ft.

8

1 mi. 14 rd. 3 yd.
318 " 5 "
1 " 39 " 4 "
1 " 67 "
4 mi. 120 rd. 1 yd.

9

751 bu. 3 pk.
135 " 1 " 6 qt.
640 " 2 "
514 " 0 " 4 "
2,041 bu. 3 pk. 2 qt.

10

5 gal. 3 qt. 1 pt.
3 " 2 " 1 "
9 gal. 2 qt.

11

35 sq. yd. 5 sq. ft.
22 " " 2 " "
22 " " 2 " "
17 " " 7 " "
17 " " 7 " "
115 sq. yd. 5 sq. ft.

Page 198.

3

1 rd. = 5½ yd. = 5 yd. 1 ft. 6 in.
1 "
5 yd. 1 ft. 5 in.

4

8 bu. 3 pk. 2 qt.
4 " 0 " 7 "
4 bu. 2 pk. 3 qt.

5

90 cu. yd.
39 " " 18 cu. ft. 966 cu. in.
50 cu. yd. 8 cu. ft. 762 cu. in.

6

200 cd. − 113 cd. = 87 cd.

7

25 mi. 49 rd. 0 yd. 1 ft.
23 " 194 " 2 "
1 mi. 174 rd. 3½ yd. 1 ft.
(½ " =) 1 " 6 in.
1 mi. 174 rd. 3 yd. 2 ft. 6 in.

8

20 gal.
5 " 2 qt. 1 pt.
14 gal. 1 qt. 1 pt.

Page 200.

1

50 bu. 6 qt.
17
853 bu. 6 qt.

2

9 mi. 6 in.
122
1,098 mi. 3 rd. 3½ yd. 1 ft.
(½ " =) 1 " 6 in.
1,098 mi. 3 rd. 3 yd. 2 ft. 6 in.

3

384 × 129 cu. in. = 1 cu. yd. 1 cu. ft. 1,152 cu. in.

4

36 A. 90 sq. rd. 16 sq. ft. 4 sq. in.
8
292 A. 80 sq. rd. 14 sq. yd. 2 sq. ft. 32 sq. in.

5

32 gal. 3 qt. 1 pt.
7
230 gal. 0 qt. 1 pt.

6

3 mi. 280 rd. 0 yd. 2 ft.
219
848 mi. 226 rd. 3 yd.

7

1 cd. 44 cu. ft.
18
24 cd. 24 cu. ft.

8

3 bu. 0 pk. 5 qt.
12
37 bu. 3 pk. 4 qt.

9

5 sq. rd. 24 sq. yd.
38
1 A. 60 sq. rd. 4½ sq. yd.
(½ " " =) 4 sq. ft. 72 sq. in.
1 A. 60 sq. rd. 4 sq. yd. 4 sq. ft. 72 sq. in.

10

5 mi. 213 rd. 1 yd. 2 ft.
4
22 mi. 213 rd. ½ yd. 2 ft.
(½ " =) 1 " 6 in.
22 mi. 213 rd. 1 yd. 0 ft. 6 in., they travel in 1 day.
26
589 mi. 103 rd. 2½ yd. 1 ft.
(½ " =) 1 " 6 in.
589 mi. 103 rd. 2 yd. 2 ft. 6 in., they travel in 26 days.

Page 201.

5

20) 428 A. 50 sq. rd. 4 sq. ft. (21 A. 66 sq. rd. 136 sq. ft. 46⅘ sq. in.
40
28
20
8 A. = 1,330 sq. rd.
120
130
120
10 sq. rd. = 2,726½ sq. ft.
20
72
60
126
120
6½ sq. ft. = 936 sq. in.
80
136
120
16/20 sq. in. = ⅘ sq. in.

REMARK.—This solution is given in full, as a model for the solution of similar problems.

4

12) 526 rd. 4 ft. 9 in.
43 rd. 4 yd. 2 ft. 1¾ in.

6

19 cu. ft. 675 cu. in. = 33,507 cu. in.
33,507 cu. in. ÷ 25 = 1,340 7/25 " "

7

52 gal. 2 qt. = 210 qt.; 8 gal. 3 qt. = 35 qt.
210 qt. = 210 kegs at 1 qt. per keg;
210 kegs ÷ 35 = 6 kegs.

8

85 bu. 1 pk. 2 qt. = 1,130 qt.;
17 bu. 2 pk. 5 qt. = 565 qt.;
1,130 qt. contains 1 qt. 1,130 times; and
1,130 times ÷ 565 = 2 times.

9

26) 64 rd. 3 yd. 1 ft.
2 rd. 2 yd. 2 ft.

10

36) 448 cu. yd.
12 cu. yd. 12 cu. ft.

11

125 bu. 3 pk. 6 qt. = 4,030 qt.;
1 bu. 3 pk. 6 qt. = 62 qt.;
4,030 qt. = 4,030 bags at 1 qt. each; and
4,030 bags ÷ 62 = 65 bags.

Page 201.

12

In 10 hours 1 man can mow $\frac{1}{7}$ as much grass as 7 men can mow; *i. e.*, $\frac{1}{7}$ of 26 A. 40 sq. rd.; and

In 1 hour 1 man will mow $\frac{1}{10}$ as much grass as he can mow in 10 hours; *i. e.*, $\frac{1}{10}$ of $\frac{1}{7}$ of 26 A. 40 sq. rd.

$\frac{1}{10}$ of $\frac{1}{7} = \frac{1}{70}$; 26 A. 40 sq. rd. ÷ 70 = 60 sq. rd.

WEIGHTS.

Page 203.

8

1,285 lb. 8 oz.
7
32) 8,998 lb. 8 oz.
281 lb. 3¼ oz.

11

16) 845,000 oz.
2|000) 52,|812 lb. 8 oz.
26 T. 812 lb.
Hence, 26 T. 812 lb. 8 oz.

13

44 lb. 6 oz.
7 " 10 "
86 lb. 12 oz.

14

1 T. 375 lb.
45
53 T. 875 lb.

15

15) 28 T. 1,375 lb.
1 T. 1,825 lb. per A.

9

63) 1 T. 968 lb. 14 oz.
47 lb. 2 oz.

10

5 T. 429 lb. = 10,429 lb. = 41,716 qr. lb.
Hence, 41,716 packages.

12

3 T.	8 cwt.	48 lb.	of groceries;
3 "	19 "	40 "	" hardware;
1 "	1 "	94 "	" furniture;
	18 "	64 "	" dry goods.
9 T.	8 cwt.	46 lb.,	total weight.

16

6 bar. 84 lb. = 20,160 oz.
3 lb. 8 oz. = 56 oz.

20,160 oz. = 20,160 da. at 1 oz. per da.;
20,160 da. ÷ 56 = 360 da.

17

13) 440 lb. 6 oz.
33 lb. 14 oz.

TIME.

Page 205.

1

6|0) 875,67|5 sec.
6|0) 14,59|4 min. 35 sec.
24) 243 h. 14 min.
7) 10 da. 3 h.
1 wk. 3 da.
Hence, 1 wk. 3 da. 3 h. 14 min. 35 sec.

2

6|0) 50,40|0 min.
24) 840 h.
7) 35 da.
5 wk.

3

366 × 24 h. = 8,784 h.

4

365 da. 5 h. 48 min. 49 sec.
24
8,765 h.
60
525,948 min.
60
31,556,929 sec.

8

9 yr. 54 da. 0 h. 37 min.
36
329 yr. 119 da. 22 h. 12 min.

9

Jan.,	31 da.	
Feb.,	29 "	
March,	31 "	
April,	30 "	
May,	31 "	
June,	30 "	
July,	3 "	12 h.

Total time, 185 da. 12 h.
24
4,452 h.
60
267,120 min.

10

1,000,000 ticks = 1,000,000 sec.
6|0) 1,000,00|0 sec.
6|0) 16,66|6 min. 40 sec.
24) 277 h. 46 min.
11 da. 13 h.
Hence, 11 da. 13 h. 46 min. 40 sec.

11

16 yr. 28 da.
11 yr. 24 da.
5 " 4 "
6 yr. 20 da. difference.

Page 206; Article 235.

12

Time	from	Boston	to	Albany,	6 h. 10 min.
"	"	Albany	"	Buffalo,	9 " 30 "
"	"	Buffalo	"	Cleveland,	5 " 35 "
"	"	Cleveland	"	Indianapolis,	8 " 55 "
"	"	Indianapolis	"	St. Louis,	9 " 10 "
"	"	Boston	"	" "	39 h. 20 min.

Page 206; Article 235.

13

8 h. 15 min.
25
10) 81 h. 15 min.
8 da. 1 h. 15 min. it takes him to chop 25 cd.

14

88 wk. 4 da. = 532 working days.
532 da. ÷ 112 = 4¾ da. = 4 da. 7 h. 30 min.

Article 236.

1

1790 yr. 4 mo. 17 da.
84 " 3 "
1706 yr. 1 mo. 17 da. = Jan. 17, 1706.

2

1799 yr. 12 mo. 14 da.
1732 " 2 " 22 "
67 yr. 9 mo. 22 da.

3

1881 yr. 11 mo. 4 da.
1880 " 1 " 7 "
1 yr. 9 mo. 27 da.

4

1882 yr. 9 mo. 19 da.
1882 " 4 " 25 "
4 mo. 24 da.

5

The age depends upon the date on which the problem is solved.

6

1885 yr. 8 mo. 16 da.
1881 " 7 " 2 "
4 yr. 1 mo. 14 da.

ENUMERATION OR COUNTING.

Page 207.

7

20 × 24 sheets = 480 sheets.

8

23 gro. 19 doz. clothes-pins.
12
295 doz. clothes-pins.
12
3,540 clothes-pins.

9

248 pigeons = 124 pairs of pigeons;
124 pairs pigeons = 10⅓ doz. pairs.

10

40 × 18 crayons = 720 crayons = 5 gro.

GENERAL REVIEW PROBLEMS IN COMPOUND NUMBERS.

Page 209.

1

3 bu.	1 pk.		
5	2	3 qt.	
4	3	5	1 pt.
5	1		
6	0	3	
6	0	7	
31 bu.	1 pk.	2 qt.	1 pt.

2

8 gal.

6 × 2 qt. = 12 qt. = 3 gal.

4 × 3 pt. = 12 pt. = 1 " 2 qt.

3 × ½ gal. = 1 " 2 " 6 "

Remainder, 2 gal.

3

27,000,000 ÷ 75 = 360,000;

hence, 360,000 min.;

360,000 min. = 250 da.

4

2 qt. + 5 pt. = 1 gal. 1 pt.;

9 × 1 gal. 1 pt. = 10 " 1 "

6

5,000 × 12 pkgs. = 60,000 pkgs.

60,000 × 4 oz. = 240,000 oz.

240,000 oz. = 15,000 lb.

5

488 bu. 1 pk. ÷ 14 = 34 bu. 3 pk. 4 qt.

7

Page 210.

100 × 4 ft. = 400 ft. = 24 rd. 1 yd. 1 ft.

8

42 sq. rd.	108 sq. ft.
40	194
38	256
36	58
38	110
31	216
29	88
1 A. 97 sq. rd.	213 sq. ft. 36 sq. in.

9

From May 10 to Dec. 10 is 7 mo.

7 mo. = $\frac{7}{12}$ yr.; and $\frac{7}{12}$ × \$420 = \$245

10

132 cd. ÷ 12 = 11 cd., 1 man can chop in 4 days;

11 cd. ÷ 4 = 2 cd. 96 cu. ft., 1 man can chop in 1 day.

11

5 T. 1,875 lb. = 11,875 lb. = 59 bar. 75 lb.

12

100 rm. 2 quires = 2,002 quires;

2,002 quires ÷ 308 = 6½ " = 6 quires 12 sheets.

Page 210.

13

926 gal. 1 qt. = 3,705 qt.; 3 gal. 1 qt. = 13 qt.
3,705 qt. = 3,705 bu. at 1 qt. for 1 bu.
3,705 bu. ÷ 13 = 285 "

14

250 × 5 cu. yd. 3 cu. ft. = 1,277 cu. yd. 21 cu. ft.

15

4 × 93 rd. = 372 rd. he walks each day;
5 × 372 " = 1,860 " " " " week;
14 × 1,860 " = 26,040 " " " " 14 weeks; and
26,040 " = 81 mi. 120 rd.

16

184 A. 46.25 sq. rd. ÷ 5 = 36 A. 137.25 sq. rd.

17

5 bu. 1 pk. = 168 qt.; 1 pk. 6 qt. = 14 qt.
168 qt. = 168 da. at 1 qt. per day.
168 da. ÷ 14 = 12 da.

18

63 × 3 T. 550 lb. = 204 T. 1,050 lb.

CHAPTER VI.

MEASUREMENTS.—RECTANGLES, TRIANGLES, TRAPEZOIDS.

Page 214.

1. 12 × 27 sq. rd. = 324 sq. rd.
2. 140 × 215 sq. yd. = 30,100 sq. yd.
3. 38 × 57.25 sq. ft. = 2,175.5 sq. ft.
4. 9.56 × 31.7 sq. in. = 303.052 sq. in.
5. { 15 ft. 3 in. = 183 in.
{ 8⅞ × 183 sq. in. = 1,624⅛ sq. in. = 11 sq. ft. 40⅛ sq. in.
6. 137 × 28.5 sq. rd. = 3,904.5 sq. rd.
7. 45.3 × 32 sq. yd. = 1,449.6 sq. yd.
8. 56 × 18 sq. in. = 1,008 sq. in. = 7 sq. ft.
9. 321 × 94 sq. ft. = 30,174 sq. ft.
10. 87.5 × 15.31 sq. mi. = 1,339.625 sq. mi.

11 ***Page 214.***

$18\frac{1}{2}$ ft. = $1\frac{4}{33}$ rd., and 71 yd. = $12\frac{10}{11}$ rd.
3 × $12\frac{10}{11}$ sq. rd. = $38\frac{8}{11}$ sq. rd., area of second triangle;
$1\frac{4}{33}$ × 15 " " = $16\frac{9}{11}$ " " " " first "
$21\frac{10}{11}$ sq. rd., difference in areas; and
$21\frac{10}{11}$ sq. rd. = 21 sq. rd. 27 sq. yd. 4 sq. ft. 72 sq. in.

12

20 × 40 sq. in. = 800 sq. in. in 1 sheet of tin;
1,152 × 800 " " = 921,600 " " required to cover roof; and
921,600 " " = 6,400 sq. ft.

13

100 × 4 × 320 sq. rd. = 128,000 sq. rd. = 800 A.

1 ***Page 215.***

44 rods long; area, 1,584 square rods.
1,584 sq. rd. = 1,584 rd. wide and 1 rd. long.
1,584 rd. wide ÷ 44 = 36 rd. wide.

2

72 rods long; area, 1,584 square rods.
1,584 sq. rd. = 1,584 rd. wide and 1 rd. long;
1,584 rd. wide ÷ 72 = 22 rd. wide.

3

44 rods long; area, 2,175 square rods.
2,175 sq. rd. = 2,175 rd. wide and 1 rd. long.
2,175 rd. wide ÷ 44 = $49\frac{19}{44}$ rd. wide.

4

72 rods long; area, 2,175 square rods.
2,175 rd. wide ÷ 72 = $30\frac{5}{24}$ rd. wide.

5

15 feet wide; area, 17,880 square feet.
17,880 ft. long ÷ 15 = 1,192 ft. long.

6

$21\frac{3}{4}$ feet wide; area, 17,880 square feet.
17,880 ft. long ÷ $21\frac{3}{4}$ = $822\frac{2}{29}$ ft. long.

Page 215.

7

15 feet wide; area, 2,436$\frac{3}{16}$ square feet.
2,436$\frac{3}{16}$ ft. long ÷ 15 = 162$\frac{33}{80}$ ft. = 162.4125 ft. long.

8

21$\frac{3}{4}$ feet wide; area, 2,436$\frac{3}{16}$ square feet.
2,436$\frac{3}{16}$ ft. long ÷ 21$\frac{3}{4}$ = 112$\frac{1}{116}$ ft. long.

9

90.5 rods wide; area, 172.4 acres.
172.4 A. = 27,584 sq. rd.
27,584 rd. long ÷ 90.5 = 304$\frac{144}{181}$ rd. long.

10

156.15 rods wide; area, 172.4 acres.
27,584 rd. long ÷ 156.15 = 176$\frac{2032}{3123}$ rd. = 176.65 + rd. long.

11

90.5 rods wide; area, 320 acres.
320 A. = 51,200 sq. rd.
51,200 rd. wide ÷ 90.5 = 565.7458 + rd. wide.

12

156.15 rods wide; area, 320 acres.
51,200 rd. wide ÷ 156.15 = 327.8898 + rd. wide.

13

330 feet long; area, 311$\frac{2}{3}$ square yards.
311$\frac{2}{3}$ sq. yd. = 2,805 sq. ft.
2,805 ft. wide ÷ 330 = 8$\frac{1}{2}$ ft. wide.

14

111 yards long; area, 311$\frac{2}{3}$ square yards.
311$\frac{2}{3}$ yd. wide ÷ 111 = 2$\frac{269}{333}$ yd. wide.

15

330 feet long; area, 2,805 square feet.
2,805 ft. wide ÷ 330 = 8$\frac{1}{2}$ ft. wide.

16

111 yards (= 333 feet) long; area, 2,805 square feet.
2,805 ft. wide ÷ 333 = 8$\frac{47}{111}$ ft. wide.

Page 215.

17

$37\frac{3}{8}$ sq. ft. = $37\frac{3}{8}$ ft. long and 1 ft. wide;
$37\frac{3}{8}$ ft. long ÷ $3\frac{3}{4}$ = $9\frac{29}{30}$ ft. long.

18

$8\frac{1}{3}$ sq. ft. = 1,200 sq. in. = 1,200 in. long and 1 in. wide;
1,200 in. long ÷ 8 = 150 in. long = $12\frac{1}{2}$ ft. long.

19

$18\frac{2}{3}$ sq. yd. = 168 sq. ft. = 168 ft. long and 1 ft. wide;
168 ft. long ÷ $10\frac{1}{2}$ = 16 ft. long.

20

$247.50 pays for 247.5 sq. yd. at $1 per sq. yd.;
247.5 sq. yd. ÷ 2.75 = 90 sq. yd. = 810 sq. ft.;
810 sq. ft. = 810 ft. wide and 1 ft. of length;
810 ft. wide ÷ 30 = 27 ft. wide.

Page 216.

1

$$\frac{42 \times 54 \text{ sq. in.}}{2} = 1{,}134 \text{ sq. in.}$$

2

$$\frac{96 \times 96 \text{ sq. ft.}}{2} = 4{,}608 \text{ sq. ft.}$$

3

$$\frac{18\frac{1}{2} \times 24\frac{1}{4} \text{ sq. ft.}}{2} = 224\tfrac{5}{16} \text{ sq. ft.}$$

4

$13\frac{1}{4}$ yd. = $39\frac{3}{4}$ ft.

$$\frac{39\frac{3}{4} \times 59\frac{2}{3} \text{ sq. ft.}}{2} = 1{,}185\tfrac{7}{8} \text{ sq. ft.}$$

5

$$\frac{56 \times 141 \text{ sq. rd.}}{2} = 3{,}948 \text{ sq. rd.}$$

6

2 × 178 sq. in. = 356 sq. in., area of parallelogram of same base and altitude;
356 sq. in. = 356 in. altitude and 1 in. base;
356 in. altitude ÷ 24 = $14\frac{5}{6}$ " " " 24 " "

7

2 × $2{,}861\frac{1}{2}$ sq. in. = 5,723 sq. in., area of parallelogram of 5,723 in. altitude and 1 in. base;
5,723 in. altitude ÷ 97 = 59 in. = 4 ft. 11 in. altitude.

Page 216.

8

$2 \times 298\frac{2}{3}$ sq. yd. $= 597\frac{1}{3}$ sq. yd., area of parallelogram of $597\frac{1}{3}$ yd., or 1,792 ft., altitude and 1 yd. base.
1,792 ft. altitude $\div 128 =$ 14 ft. altitude.

9

2×12 sq. yd. $= 24$ sq. yd. $= 216$ sq. ft. $= 216$ ft. base and 1 ft. altitude;
216 ft. base $\div 9 =$ 24 ft. base.

10

2×12 A. 56 sq. rd. $= 24$ A. 112 sq. rd. $= 3{,}952$ sq. rd. $= 3{,}952$ rd. base and 1 rd. altitude;
3,952 rd. base $\div 70\frac{1}{2} = 56\frac{8}{141}$ rd. base.

Page 217.

1

15×18 sq. in. $= 270$ sq. in.

2

23×25 sq. ft. $= 575$ sq. ft.

3. 155×231 sq. yd. $= 35{,}805$ sq. yd.

4. $8\frac{1}{3} \times 17\frac{5}{6}$ sq. ft. $= 148$ sq. ft. 88 sq. in.

5. 5 yd. 2 ft. = 17 ft.; $7\frac{1}{4} \times 17$ sq. ft. $= 123\frac{1}{4}$ sq. ft.

6. $(15.75 =)\ 15\frac{3}{4} \times 32\frac{3}{8}$ sq. ft. $= 509\frac{29}{32}$ sq. ft. $= 509.90625$ sq. ft.

Page 218.

1

$13 \times \frac{10 + 27}{2}$ sq. in. $= 240\frac{1}{2}$ sq. in.

2

$25 \times \frac{40 + 22}{2}$ sq. yd. $= 775$ sq. yd.

3

300 rd. $= \frac{15}{16}$ mi.; $\frac{15}{16} \times \frac{63 + 1.35}{2}$ sq. mi. $= 30.164\frac{1}{16}$ sq. mi.

4

$\frac{1}{2}$ ft. $= \frac{1}{33}$ rd.; $40 \times \frac{\frac{1}{33} + 5}{2}$ sq. rd. $= 100\frac{20}{33}$ sq. rd.

5

13 ft. $= 4\frac{1}{3}$ yd., and 17 ft. $= 5\frac{2}{3}$ yd.; $9\frac{1}{4} \times \frac{4\frac{1}{3} + 5\frac{2}{3}}{2}$ sq. yd. $= 46\frac{1}{4}$ sq. yd.

6

14 ft. 8 in. $= 14\frac{2}{3}$ ft.; and $14\frac{2}{3} \times \frac{10 + 2\frac{1}{2}}{2}$ sq. ft. $= 91\frac{2}{3}$ sq. ft.

1 ***Page 218; Article 253.***

145 × 225 sq. rd. = 32,625 sq. rd. = 203 A. 145 sq. rd.

2

$\frac{3}{4}$ sq. yd. = $6\frac{3}{4}$ sq. ft. in 1 yd. of carpeting $\frac{3}{4}$ yd. wide;

$\frac{21\frac{1}{4} \times 26 \text{ sq. ft.}}{6\frac{3}{4}}$ = $81\frac{23}{27}$ yd. $\frac{3}{4}$ yd. wide required.

3

$83\frac{1}{3}$ sq. yd. = $83\frac{1}{3}$ yd. long and 1 yd. wide;
$83\frac{1}{3}$ yd. long ÷ $6\frac{1}{4}$ = $13\frac{1}{3}$ yd. long = 40 ft. long.
The floor is 40 ft. long and ($6\frac{1}{4}$ yd. =) 18 ft. 9 in. wide.

4

$6\frac{2}{3} \times \frac{44 + 32}{2}$ sq. yd. = $253\frac{1}{3}$ sq. yd.

5 ***Page 219.***

4,719 sq. yd. = 42,471 sq. ft.
42,471 sq. ft. = 42,471 ft. deep and 1 ft. front; and
42,471 ft. deep ÷ 121 = 351 " " the other dimension.

6

10 ft. 10 in. = $10\frac{5}{6}$ ft., and 9 ft. 2 in. = $9\frac{1}{6}$ ft.

$\frac{9\frac{1}{6} \times 10\frac{5}{6} \text{ sq. ft.}}{2}$ = $49\frac{47}{72}$ sq. ft. = 49 sq. ft. 94 sq. in.

7

2 × 115 sq. yd. = 230 sq. yd. = 2,070 sq. ft. in parallelogram.
2,070 sq. ft. = 2,070 ft. base of a parallelogram 1 ft. high.
2,070 ft. base ÷ 50 = 41.4 ft., base.

8

5 × 8 sq. rd. = 40 sq. rd. = $\frac{1}{4}$ A. in 1 lot.
1 A. = 4 lots each 5 by 8 rd.
$33\frac{1}{2}$ × 4 lots = 134 lots in $33\frac{1}{2}$ A.
134 × \$100 = \$13,400, receipts for $33\frac{1}{2}$ A.
$33\frac{1}{2}$ × 225 = 7,537.50, cost of $33\frac{1}{2}$ A.
\$5,862.50, gain.

9

3 A. 68.8 sq. rd. = 548.8 sq. rd., area;

$\frac{21 \text{ rd.} + 38\frac{1}{2} \text{ rd.}}{2}$ = $29\frac{3}{4}$ rd., average width.

548.8 sq. rd. = 548.8 rd. altitude and 1 rd. base.
548.8 rd. altitude ÷ $29\frac{3}{4}$ = $18\frac{38}{85}$ rd., altitude.

Page 219. 10

$24\frac{1}{2}$ ft. − 16 ft. = $8\frac{1}{2}$ ft.

(2×30 ft.)+(2×40 ft.) = 140 ft., girth of the barn;

140 × 16 sq. ft. = 2,240 sq. ft. in the four sides of the barn;

$8\frac{1}{2}$ × 30 " " = 255 " " " " two gables;

2,495 " " of boards.

THE CIRCLE.

Page 220.

1. $3\frac{1}{7}$ × 8 ft. = $25\frac{1}{7}$ ft., circumference.
2. $3\frac{1}{7}$ × 32 in. = $100\frac{4}{7}$ in. = 8 ft. $4\frac{4}{7}$ in., circumference.
3. $3\frac{1}{7}$ × 17 ft. = 53 ft. $5\frac{1}{7}$ in., circumference.
4. $3\frac{1}{7}$ × 13 in. = $40\frac{6}{7}$ in. = 3 ft. $4\frac{6}{7}$ in., circumference.
5. 359 in. ÷ $3\frac{1}{7}$ = $114\frac{5}{22}$ in. = 9 ft. $6\frac{5}{22}$ in., diameter.
6. $16\frac{1}{2}$ ft. ÷ $3\frac{1}{7}$ = 5 ft. 3 in., diameter.
7. 534.5 yd. ÷ $3\frac{16}{113}$ = 170 yd. 4.9 + in., diameter.
8. $16\frac{1}{2}$ in. ÷ $3\frac{1}{7}$ = $5\frac{1}{4}$ in., diameter.

Page 221; Article 256. 1

$3\frac{16}{113}$ × 113 ft. = 355 ft., circumference;

$$\frac{113}{2} \times \frac{355 \text{ sq. ft.}}{2} = 10{,}028\tfrac{3}{4} \text{ sq. ft., area.}$$

2

$3\frac{1}{7}$ × 16 in. = $50\frac{2}{7}$ in., circumference;

$$\frac{16}{2} \times \frac{50\frac{2}{7} \text{ sq. in.}}{2} = 201\tfrac{1}{7} \text{ sq. in., area.}$$

3

2 × 15 in. = 30 in., diameter;

$3\frac{1}{7}$ × 30 " = $94\frac{2}{7}$ " circumference;

$$\frac{30}{2} \times \frac{94\frac{2}{7} \text{ sq. in.}}{2} = 707\tfrac{1}{7} \text{ sq. in., area.}$$

4

721 rd. ÷ $3\frac{16}{113}$ = $229\frac{178}{355}$ rd., diameter;

$$\frac{721}{2} \times \frac{229\frac{178}{355} \text{ sq. rd.}}{2} = 41{,}367\tfrac{5}{8} + \text{ sq. rd., area.}$$

5

320 rd. ÷ $3\frac{16}{113}$ = $101\frac{61}{71}$ rd., circumference;

$$\frac{320}{2} \times \frac{101\frac{61}{71} \text{ sq. rd.}}{2} = 8{,}148.732 + \text{ sq. rd., area.}$$

6 ***Page 221.***

1,000 yd. $\div 3\frac{16}{113} = 318\frac{22}{71}$ yd., diameter;

$$\frac{1{,}000}{2} \times \frac{318\frac{22}{71}\text{ sq. yd.}}{2} = 79{,}577.464 + \text{ sq. yd., area.}$$

1 ***Article 257.***

Perimeter of square, $4 \times 19\frac{4}{5}$ mi. $= 79\frac{1}{5}$ mi.
Circumference of circle, $3\frac{16}{113} \times 19\frac{4}{5}$ " $= 62\frac{23}{113}$ "
Difference, 16.9964 + mi.

2

Diameter of circle, 100 ft. $\div 3\frac{1}{7} = 31\frac{9}{11}$ ft.

$$\text{Area of circle, } \frac{100}{2} \times \frac{31\frac{9}{11}\text{ sq. ft.}}{2} = 795\frac{5}{11}\text{ sq. ft.}$$

Side of square, 100 ft. $\div 4 = 25$ ft.
Area of square, 25×25 sq. ft. $= 625$ " "
Difference, $170\frac{5}{11}$ sq. ft. $= 170.45+$ sq. ft.

3

$3\frac{1}{7} \times 18$ ft. $= 56\frac{4}{7}$ ft., circumference;

$$\frac{18}{2} \times \frac{56\frac{4}{7}\text{ sq. ft.}}{2} = 254\frac{4}{7}\text{ sq. ft., area.}$$

4

93 rd. $\div 3\frac{16}{113} = 29\frac{214}{355}$ rd., diameter;

$$\frac{93}{2} \times \frac{29\frac{214}{355}\text{ sq. rd.}}{2} = 688.265 + \text{ sq. rd., area.}$$

5

$50\frac{2}{7}$ in. $\div 3\frac{1}{7} = 16$ in., diameter;

$$\frac{16}{2} \times \frac{50\frac{2}{7}\text{ sq. in.}}{2} = 201\frac{1}{7}\text{ sq. in., area.}$$

RECTANGULAR SOLIDS.

1 ***Page 223.***

14 feet long, 11 feet wide, and 7.5 feet deep.

A part of the body 14 ft. long, 1 ft. wide, and 1 ft. deep contains 14 cu. ft.

A part 14 ft. long, 11 ft. wide, and 1 ft. deep contains 11 × 14 cu. ft.; and

The body 14 ft. long, 11 ft. wide, and 7.5 ft. deep contains

$7.5 \times 11 \times 14$ cu. ft. $= 1{,}155$ cu. ft.

Page 223.

2

37 feet long, 11 feet wide, and 7.5 feet deep.
7.5 × 11 × 37 cu. ft. = 3,052.5 cu. ft.

3

14 feet long, 8.2 feet wide, and 7.5 feet deep.
7.5 × 8.2 × 14 cu. ft. = 861 cu. ft.

4

14 feet long, 11 feet wide, and 13 feet deep.
13 × 11 × 14 cu. ft. = 2,002 cu. ft.

5

37 feet long, 8.2 feet wide, and 13 feet deep.
13 × 8.2 × 37 cu. ft. = 3,944.2 cu. ft.

6

27 inches long, 16 inches wide, and 12 inches high.
12 × 16 × 27 cu. in. = 5,184 cu. in.

7

5.21 inches long, 16 inches wide, and 12 inches high.
12 × 16 × 5.21 cu. in. = 1,000.32 cu. in.

8

27 inches long, 4.25 inches wide, and 12 inches high.
12 × 4.25 × 27 cu. in. = 1,377 cu. in.

9

27 inches long, 16 inches wide, and 2.9 inches high.
2.9 × 16 × 27 cu. in. = 1,252.8 cu. in.

10

5.21 inches long, 4.25 inches wide, and 2.9 inches high.
2.9 × 4.25 × 5.21 cu. in. = 64.21325 cu. in.

11

576 feet by 125 feet by 87 feet.
87 × 125 × 576 cu. ft. = 232,000 cu. yd.

12

72 yards by 125 feet by 87 feet.
72 yd. = 216 ft.
87 × 125 × 216 cu. ft. = 87,000 cu. yd.

Page 223.

13

576 feet by 61 yards by 87 feet.
61 yd. = 183 ft.
87 × 183 × 576 cu. ft. = 339,648 cu. yd.

14

576 feet by 125 feet by 45 yards.
45 yd. = 135 ft.
135 × 125 × 576 cu. ft. = 360,000 cu. yd.

15

72 yards by 61 yards by 45 yards.
45 × 61 × 72 cu. yd. = 197,640 cu. yd.

Page 224;
Article 261.

1

4 inches wide; 5 inches high; contents, 1,280 cubic inches.
1,280 cu. in. = 1,280 in. long, 1 in. wide, and 1 in. high.
1,280 in. long ÷ (4 × 5 =) 20 = 64 in. long.

2

5.6 inches wide; 5 inches high; contents, 1,280 cubic inches.
1,280 in. long ÷ (5.6 × 5 =) 28 = $45\frac{5}{7}$ in. long.

3

4 inches wide; $7\frac{1}{4}$ inches high; contents, 1,280 cubic inches.
1,280 in. long ÷ (4 × $7\frac{1}{4}$ =) 29 = $44\frac{4}{29}$ in. long.

4

4 inches wide; 5 inches high; contents, 1 cubic foot.
(1 cu. ft. =) 1,728 in. long ÷ (4 × 5 =) 20 = 86.4 in. long.

5

5.6 inches wide; $7\frac{1}{4}$ inches high; contents, 1 cubic foot.
1,728 in. long ÷ (5.6 × $7\frac{1}{4}$ =) 40.6 = $42\frac{114}{203}$ in. long.

6

12 feet high; 4 feet thick; contents, 6,000 cubic feet.
6,000 ft. long ÷ (12 × 4 =) 48 = 125 ft. long.

7

8 feet high; 4 feet thick; contents, 6,000 cubic feet.
6,000 ft. long ÷ (8 × 4 =) 32 = $187\frac{1}{2}$ ft. long.

Page 224.

8

12 feet high; 6.375 feet thick; contents, 6,000 cubic feet.
6,000 ft. long ÷ (12 × 6.375 =) $76\frac{1}{2}$ = 78.43137 + ft. long.

9

12 feet high; 4 feet thick; contents, 200 cubic yards.
200 cu. yd. = 5,400 cu. ft.;
5,400 ft. long ÷ (12 × 4 =) 48 = $112\frac{1}{2}$ ft. long.

10

8 feet high; 6.375 feet thick; contents, 200 cubic yards.
5,400 ft. long ÷ (8 × 6.375 =) 51 = $105\frac{15}{17}$ ft. long.

11

4 yards deep; 12.3 yards wide; contents, 196.8 cubic feet.
4 yd. = 12 ft., and 12.3 yd. = 36.9 ft.
196.8 ft. long ÷ (12 × 36.9 =) 442.8 = $\frac{164}{369}$ ft. long = $5\frac{1}{3}$ in. long.

12

$3\frac{1}{2}$ inches deep; 12.3 yards wide; contents, 196.8 cubic feet.
12.3 yd. = 36.9 ft., and $3\frac{1}{2}$ in. = $\frac{7}{24}$ ft.
196.8 ft. long ÷ ($\frac{7}{24}$ × 36.9 =) $10\frac{61}{80}$ = 18 ft. $3\frac{3}{7}$ in. long.

13

4 yards deep; $3\frac{1}{2}$ feet wide; contents, 196.8 cubic feet.
196.8 ft. long ÷ (12 × $3\frac{1}{2}$ =) 42 = 4 ft. $8\frac{8}{35}$ in. long.

14

4 yards deep; 12.3 yards wide; contents, $3\frac{1}{2}$ cubic yards.
$3\frac{1}{2}$ yd. long ÷ (4 × 12.3 =) 49.2 = $2\frac{23}{41}$ in. long.

15

$3\frac{1}{2}$ inches deep; $3\frac{1}{2}$ feet wide; contents, $3\frac{1}{2}$ cubic yards.
$3\frac{1}{2}$ in. = $\frac{7}{72}$ yd., and $3\frac{1}{2}$ ft. = $1\frac{1}{6}$ yd.
$3\frac{1}{2}$ yd. long ÷ ($\frac{7}{72}$ × $1\frac{1}{6}$ =) $\frac{49}{432}$ = $92\frac{4}{7}$ ft. long.

16

12.25 cd. = 1,568 cu. ft.
1,568 ft. wide ÷ (56 × 8 =) 448 = $3\frac{1}{2}$ ft. wide.

Article 262.

1

6 × 18 × 21 cu. ft. = 2,268 cu. ft. = 84 cu. yd. = 84 loads.

2

7 × 4 × 45 cu. ft. = 1,260 cu. ft. = $9\frac{27}{32}$ cd.

3 ***Page 224.***

12 in. = 24 half-in.; 6 in. = 12 half-in.; 3 in. = 6 half-in.
6 × 12 × 24 half-inch cubes = 1,728 half-inch cubes.

4

2 × 4 × 8 cu. in. = 64 cu. in. in 1 brick.
100,000 × 64 cu. in. = 6,400,000 cu. in. = $137\frac{127}{729}$ cu. yd.

5

$422\frac{1}{6}$ cu. yd. = $11,398\frac{1}{2}$ cu. ft.
$11,398\frac{1}{2}$ ft. long ÷ ($25\frac{1}{2} \times 12\frac{5}{12}$ =) $316\frac{5}{8}$ = 36 ft. long.

BUSINESS MEASUREMENTS.

1 ***Page 227.***

268.8 cu. in. − 231 cu. in. = 37.8 cu. in.;
568.5 × 37.8 cu. in. = 21,489.3 cu. in.

2

	2,150.42	cu. in. in 1 bu.	
8 × 231 cu. in. =	1,848	" "	of water in the tub.
The tub will hold	302.42	" "	= 1 gal. 1.236 + qt. more.

3

15,000 × 231 cu. in. = 346,500 cu. in., capacity of tank; and
346,500 cu. in. = $1,289\frac{1}{16}$ bu.

4

840 × 16 × 24 sq. in. = 322,560 sq. in. = 2,240 sq. ft., area of roof;
2,240 sq. ft. = 22.40 squares of roofing.

5

44 × 75 sq. ft. = 3,300 sq. ft. = 33 squares of flooring.

Area of floor,	3,300	sq. ft.
Add ¼ for matched flooring,	825	" "
Matched flooring 1 in. thick,	4,125	" "
Add ½ for extra ½ in. thick,	2,062.5	" "
Required flooring 1½ in. thick,	6,187½	" "

Page 228.

6

11.52 squares = 1,152 sq. ft.
1,152 × 3 slates = 3,456 slates.

7

2 × 25 × 67.5 sq. ft. = 3,375 sq. ft., area of roof.
500 shingles cover ½ square = 50 sq. ft.
3,375 sq. ft. = 3,375 bunches at 1 bunch to a sq. ft.
3,375 bunches ÷ 50 = 67½ bunches.

8

(2 × 36 ft.) + (2 × 24 ft.) = 120 ft., length of the four walls;
12 × 120 sq. ft. = 1,440 sq. ft. = 160 sq. yd. in the walls;
24 × 36 " " = 864 " " = 96 " " " " ceiling.
Total area, 256 " "
256 × $.30 = $76.80, cost.

9

(2 × 14 ft.) + (2 × 20 ft.) = 68 ft., length of the four walls;
11½ × 68 sq. ft. = 782 sq. ft. = 86⁸⁄₉ sq. yd. in the four walls;
14 × 20 " " = 280 " " = 31⅑ " " " " ceiling.
118 " " to be lathed.
118 sq. yd. = 118 bunches at 1 sq. yd. to a bunch.
118 bunches ÷ 5 = 23.6 bunches of lath used.

10

(2 × 70 ft.) + (2 × 30 ft.) = 200 ft., total length of walls;
20 × 200 sq. ft. = 4,000 sq. ft. in the walls;
30 × 70 " = 2,100 " " " ceiling;
Total area, 6,100 " " = 677⁷⁄₉ sq. yd.

11

24 × 87.5 sq. ft. = 2,100 sq. ft. = 233⅓ sq. yd. in the ceiling.
233⅓ × $1 = $233⅓.

12

1⅔ × 60 × 126 cu. ft. = 12,600 cu. ft. = 466⅔ cu. yd.

13

¼ mi. = 440 yd.; 49½ ft. = 16½ yd.
16½ × 440 sq. yd. = 7,260 sq. yd.; 7,260 × $.81¼ = $5,898.75.

14 ***Page 228.***

9 × 16 sq. in. = 144 sq. in. = 1 sq. ft. in 1 pane of glass.
Hence, there are 50 panes in a box.

15

3 ft. = 36 in.; 6 ft. 8 in. = 80 in.; 50 sq. ft. = 7,200 sq. in.
36 × 80 sq. in. = 2,880 sq. in. of glass required for 1 [window.
12 × 20 " " = 240 " " in 1 pane.
2,880 panes 1 in. sq. ÷ 240 = 12 panes 12 × 20 in. for 1 window.
32 × 12 panes = 384 " for 32 windows.
7,200 panes 1 in. sq. ÷ 240 = 30 " 12 × 20 in. in 1 box.
384 panes = 384 boxes of 1 pane each.
384 boxes ÷ 30 = $12\frac{4}{5}$ "

16

3 × 11 in. + 2 ft. 9 in. = 66 in., width of tops of the 4 steps.
4 × 8 " = 32 " " " fronts " " 4 "
98 " total width of tops and fronts.
4 ft. 8 in. = 56 in., length of each step.
56 × 98 sq. in. = 5,488 sq. in., area of tops and fronts.
2 × 3 × 8 × 11 " " = 528 " " " " ends of 3 steps.
2 × 8 × 33 " " = 528 " " " " " " broad step.
Total area, 6,544 " " = $45\frac{4}{9}$ sq. ft.
$45\frac{4}{9}$ × $ .21 = $9.54.

17

(2 × 24 ft.) + (2 × 32 ft.) = 112 ft., length of walls.
16 × 112 sq. ft. = 1,792 sq. ft. in walls 16 ft. high.
9 × 24 " " = 216 " " " gables.
Total surface, 2,008 " "
$\frac{8 \times 3 \times 6\frac{1}{2}\text{ sq. ft.}}{2}$ = 78 " " to be deducted.
Surface to be painted, 1,930 " " = $214\frac{4}{9}$ sq. yd.
$214\frac{4}{9}$ × $ $.31\frac{1}{2}$ = $67.55, cost of the job.

18 ***Page 229.***

52 × 28 × 8 cu. ft. = 11,648 cu. ft. = $431\frac{11}{27}$ cu. yd.

19

$1\frac{1}{2}$ × 4 × 2,000 cu. ft. = 12,000 cu. ft. = $444\frac{4}{9}$ cu. yd. = $444\frac{4}{9}$ loads.

Page 229.

20

$20 \times 13 \times 1{,}400$ cu. ft. $= 364{,}000$ cu. ft. $= 13{,}481\frac{13}{27}$ cu. yd.

21

270 cu. yd. $=$ 7,290 cu. ft. $=$ 7,290 ft. wide, 1 ft. long, and 1 ft. deep.
7,290 ft. wide $\div$ $(6 \times 45 =)$ $270 = 27$ ft. wide.

22

10 ft. 6 in. = 126 in.; 8 ft. 3 in. = 99 in.; 7 ft. = 84 in.
$84 \times 99 \times 126$ cu. in. $= 1{,}047{,}816$ cu. in. $= 4{,}536$ gal. $= 72$ hhd.

23

$9 \times 10 \times 12 \times 1{,}728$ cu. in. $= 1{,}866{,}240$ cu. in. $=$
8,078.96103 + gal. = 256.4749 + bar.

24

$$\frac{15' + 8'}{2} = 11\tfrac{1}{2}', \text{ average width of boards.}$$

$$5 \times 14 \times \frac{11\frac{1}{2}}{12} \text{ board feet} = 67\tfrac{1}{12} \text{ ft. of lumber.}$$

25

$2 \times 4 \times 8$ cu. in. $=$ 64 cu. in. in 1 brick $= 27$ bricks in 1 cu. ft.
$5 \times 9 \times 12$ cu. ft. $=$ 540 cu. ft. in the pile.
540×27 bricks $= 14{,}580$ bricks.

26

$2 \times (30$ ft. $+ 40$ ft.$) = 140$ ft., total length of the four sills.
$\frac{9}{12} \times \frac{13}{12} \times 140$ cu. ft. $= 113\frac{3}{4}$ cu. ft. of timber.

27

(*1*) $5.5 \times 14 \times 47$ cu. ft. $= 3{,}619$ cu. ft. $= 219\frac{1}{3}$ perches.
(*2*) 3,619 cu. ft. $= 28\frac{35}{128}$ cd.

28

$2 \times (6$ yd. $+ 5$ yd.$) = 22$ yd., total length of walls.

$3\frac{1}{2} \times 22$ sq. yd. $=$ 77 sq. yd. of walls;
5×6 " " $=$ 30 " " " ceiling;
107 " " to be calcimined.

107 $\times 15\frac{1}{8}$¢ $= \$16.18\frac{3}{8}$, cost of calcimining.

29 ***Page 229.***

(*1*) ($\frac{12}{12}$ =) 1 × $\frac{18}{12}$ × 30 cu. ft. = 45 ft. of timber; and
(*2*) 12 × 45 sq. ft. = 540 ft. of lumber.

30

4 × 8 sq. in. = 32 sq. in. covered by 1 brick.
4 × 100$\frac{1}{3}$ × 144 sq. in. = 57,792 " " to be covered.
57,792 sq. in. = 57,792 bricks each covering 1 sq. in.
57,792 bricks ÷ 32 = 1,806 " " " 4 by 8 in.

31

2 × (48 ft. + 25 ft.) = 146 ft., total length of the walls.
$\frac{12\frac{1}{4}}{12}$ × 18 × 146 cu. ft. = 2,682$\frac{3}{4}$ cu. ft. in the walls.
2,682$\frac{3}{4}$ × 22$\frac{1}{2}$ bricks = 60,361$\frac{7}{8}$ bricks in the walls.
60,361$\frac{7}{8}$ × $9.50 = $573.437, cost without deductions.
Deduct .025 or $\frac{1}{40}$ = 14.335
I must pay $559.10 for materials and labor.

32 ***Page 230.***

1$\frac{1}{2}$ A. = 7,260 sq. yd.; 1 ft. 4 in. = $\frac{4}{3}$ ft. = $\frac{4}{9}$ yd.
$\frac{4}{9}$ × 7,260 cu. yd. = 3,226$\frac{2}{3}$ cu. yd.

33

(2 × 20 ft.) + (2 × 24 ft.) = 88 ft., length of walk.
2 × 88 sq. ft. = 176 sq. ft. of flagging.
176 × $ .10$\frac{1}{8}$ = $17.82.

34

3$\frac{1}{7}$ × 6 ft. = 18$\frac{6}{7}$ ft., circumference of excavation.
3$\frac{1}{7}$ × 3 " = 9$\frac{3}{7}$ " " " well hole.
$\frac{1}{2}$ of 6 × $\frac{1}{2}$ of 18$\frac{6}{7}$ sq. ft. = 29$\frac{2}{7}$ sq. ft., area of excavation.
$\frac{1}{2}$ " 3 × $\frac{1}{2}$ " 9$\frac{3}{7}$ " " = 7$\frac{1}{14}$ " " " " well hole.
Area of bottom of wall, 22$\frac{3}{14}$ " "
30 × 22$\frac{3}{14}$ sq. ft. = 666$\frac{3}{7}$ sq. ft. = 38$\frac{4}{7}$ perches.

35

12 × $\frac{10}{12}$ × 16 sq. ft. = 160 sq. ft.

36

4 × $\frac{16}{12}$ × 18 sq. ft. = 96 sq. ft.

37

1 ft. 2′ = $\frac{7}{6}$ ft., and 10′ = $\frac{5}{6}$ ft.
$\frac{7}{6}$ × $\frac{5}{6}$ × 25 cu. ft. = 24$\frac{11}{36}$ cu. ft.

38

10 × $\frac{10}{12}$ × 48 sq. ft. = 400 sq. ft.

Page 230.

39

$18 \times 2 \times \frac{4}{12} \times 15$ sq. ft. $= 180$ sq. ft.

40

7 cd. $= 7 \times 128$ cu. ft. $= 896$ cu. ft.
896 cu. ft. $= 896$ ft. long, 1 ft. wide, and 1 ft. high.
896 ft. long $\div (4 \times 2 =)\ 8 = 112$ ft. long.

41

4 rd. + 2 ft. 3′ + 4 ft. = 4 rd. 6 ft. 3′, length of walk on shorter side of lot.
7 rd. 12 ft. 6′ + 2 ft. 3′ = 7 " 14 " 9′, length of walk on longer side of lot.
Total length of walk, 12 rd. 4 ft. 6′ = $202\frac{1}{2}$ ft.

$2\frac{1}{2} \times 4 \times 202\frac{1}{2}$ sq. ft. $= 2{,}025$ sq. ft. of lumber.

\$15 per M $= 1\frac{1}{2}$¢ per ft.; and $2{,}025 \times 1\frac{1}{2}$¢ $=$ \$$30.37\frac{1}{2}$, cost of lumber.

Page 231.

42

2 ft. $4\frac{1}{2}$ in. $= 2\frac{3}{8}$ ft.
$2\frac{3}{8} \times 8 \times 33$ cu. ft. $= 627$ cu. ft.
$627 \times .8$ bu. $= 501.6$ bu.

43

$5 \times 16 \times 20$ cu. ft. $= 1{,}600$ cu. ft.
$1{,}600 \times .64$ bu. $= 1{,}024$ bu.

44

10 ft. 6′ $= 10\frac{1}{2}$ ft.; 3 ft. 4′ $= 3\frac{1}{3}$ ft.; and 1 ft. 3′ $= 1\frac{1}{4}$ ft.
$\frac{5}{4} \times \frac{10}{3} \times \frac{21}{2}$ cu. ft. $= 43\frac{3}{4}$ cu. ft.
$43\frac{3}{4} \times .64$ bu. $= 28$ bu.

45

$\frac{1}{2}$ of (7 ft. + 10 ft.) $= 8\frac{1}{2}$ ft., average width of crib.
$8\frac{1}{2} \times 12 \times 100 \times .64$ bu. $= 6{,}528$ bu.

46

(*a*) $6 \times 8 \times 4\frac{1}{2} \times .8$ bu. $= 172.8$ bu. of wheat.
(*b*) $6 \times 9\frac{1}{4} \times 4\frac{1}{2} \times .8$ " $= 199.8$ " " oats.
(*c*) $6 \times 6 \times 4\frac{1}{2} \times .8$ " $= 129.6$ " " shelled corn.
502.2 " in the three bins.

47

$18 \times 25 \times 40$ cu. ft. $= 18{,}000$ cu. ft. $= \frac{18000}{270}$ T. $= 66\frac{2}{3}$ T.

48

$7\frac{1}{4} \times 8\frac{1}{3} \times 15$ cu. ft. $= 906\frac{1}{4}$ cu. ft. $= \dfrac{906\frac{1}{4}}{550}$ T. $= 1\frac{57}{88}$ T.

49

$\frac{9}{2} \times 12 \times 30$ cu. ft. $= 1{,}620$ cu. ft. $= \frac{1620}{550}$ T. $= 2\frac{52}{55}$ T.

GENERAL REVIEW PROBLEMS IN MEASUREMENTS.

Page 232.

Required, the square rods in a field

1. 72 rods long and 21 rods wide.
21×72 sq. rd. $= 1{,}512$ sq. rd.

2. $43\frac{3}{4}$ rods long and 21 rods wide.
$21 \times 43\frac{3}{4}$ sq. rd. $= 918\frac{3}{4}$ sq. rd.

3. 72 rods long and 37.7 rods wide.
37.7×72 sq. rd. $= 2{,}714.4$ sq. rd.

4. $43\frac{3}{4}$ rods long and 37.7 rods wide.
37.7×43.75 sq. rd. $= 1{,}649.375$ sq. rd.

Required, the square yards in a carpet

5. $7\frac{1}{2}$ yards long and $4\frac{3}{4}$ yards wide.
$4\frac{3}{4} \times 7\frac{1}{2}$ sq. yd. $= 35\frac{5}{8}$ sq. yd.

6. $6\frac{2}{3}$ yards long and $4\frac{3}{4}$ yards wide.
$4\frac{3}{4} \times 6\frac{2}{3}$ sq. yd. $= 31\frac{2}{3}$ sq. yd.

7. $7\frac{1}{2}$ yards long and 5.625 ($= 5\frac{5}{8}$) yards wide.
$5\frac{5}{8} \times 7\frac{1}{2}$ sq. yd. $= 42\frac{3}{16}$ sq. yd.

8. $6\frac{2}{3}$ yards long and $5\frac{5}{8}$ yards wide.
$5\frac{5}{8} \times 6\frac{2}{3}$ sq. yd. $= 37\frac{1}{2}$ sq. yd.

Required, the square yards in a ceiling

9. 87.3 feet by 21.55 feet.
87.3×21.55 sq. ft. $= 1{,}881.315$ sq. ft. $= 209.035$ sq. yd.

10. $34\frac{7}{12}$ feet by 21.55 feet.
$21.55 \times 34\frac{7}{12}$ sq. ft. $= 8{,}943\frac{1}{4}$ sq. ft. $= 82.80 +$ sq. yd.

11. 87.3 feet by 25.5 feet.
25.5×87.3 sq. ft. $= 2{,}226.15$ sq. ft. $= 247.35$ sq. yd.

12. $34\frac{7}{12}$ feet by 25.5 feet.
$25\frac{1}{2} \times 34\frac{7}{12}$ sq. ft. $= 881\frac{7}{8}$ sq. ft. $= 97.9861 +$ sq. yd.

Required, the cubic contents of a body

13. 5 yards long, 5 feet wide, and 5 inches high.
5 yd. $= 15$ ft., and $5' = \frac{5}{12}$ ft.
$\frac{5}{12} \times 5 \times 15$ cu. ft. $= 31\frac{1}{4}$ cu. ft.

14. ($8\frac{1}{4}$ yd. $=$) $24\frac{3}{4}$ ft. long, 5 ft. wide, and (5 inches $=$) $\frac{5}{12}$ ft. high.
$\frac{5}{12} \times 5 \times 24\frac{3}{4}$ cu. ft. $= 51\frac{9}{16}$ cu. ft.

Page 232. Required, the cubic contents of a body

15. (5 yd. =) 15 feet long, $8\frac{1}{4}$ feet wide, and (5′ =) $\frac{5}{12}$ ft. high.
$\frac{5}{12} \times \frac{33}{4} \times 15$ cu. ft. = $51\frac{9}{16}$ cu. ft.

16. (5 yd. =) 15 feet long, 5 feet wide, and ($8\frac{1}{4}$′ =) $\frac{11}{16}$ ft. high.
$\frac{11}{16} \times 5 \times 15$ cu. ft. = $51\frac{9}{16}$ cu. ft.

17. $8\frac{1}{4}$ yd. long, $8\frac{1}{4}$ ft. wide, and $8\frac{1}{4}$′ high.
$8\frac{1}{4}$ yd. = $24\frac{3}{4}$ ft., and $8\frac{1}{4}$′ = $\frac{11}{16}$ ft.
$\frac{11}{16} \times \frac{33}{4} \times \frac{99}{4}$ cu. ft. = $140\frac{97}{256}$ cu. ft.

18. 12 ft. 8′ by 5 ft. 6′ by 4 ft. 2′.
12 ft. 8′ = $12\frac{2}{3}$ ft.; 5 ft. 6′ = $5\frac{1}{2}$ ft.; and 4 ft. 2′ = $4\frac{1}{6}$ ft.
$\frac{25}{6} \times \frac{11}{2} \times \frac{38}{3}$ cu. ft. = $290\frac{5}{18}$ cu. ft.

19. $7\frac{1}{2}$ ft. by $5\frac{1}{2}$ ft. by $4\frac{1}{6}$ ft.
$\frac{25}{6} \times \frac{11}{2} \times \frac{15}{2}$ cu. ft. = $171\frac{7}{8}$ cu. ft.

20. $12\frac{2}{3}$ ft. by $4\frac{5}{6}$ ft. by $4\frac{1}{6}$ ft.
$\frac{25}{6} \times \frac{29}{6} \times \frac{38}{3}$ cu. ft. = $255\frac{5}{54}$ cu. ft.

21. $12\frac{2}{3}$ ft. by $5\frac{1}{2}$ ft. by $3\frac{1}{12}$ ft.
$\frac{37}{12} \times \frac{11}{2} \times \frac{38}{3}$ cu. ft. = $214\frac{29}{36}$ cu. ft.

22. $7\frac{1}{2}$ ft. by $4\frac{5}{6}$ ft. by $3\frac{1}{12}$ ft.
$\frac{37}{12} \times \frac{29}{6} \times \frac{15}{2}$ cu. ft. = $111\frac{37}{48}$ cu. ft.

23

The surface of the box consisted of 2 sides 7 by $9\frac{1}{2}$ in.; 2 sides 4 by $9\frac{1}{2}$ in.; and 2 ends 4 by 7 in.

$2 \times 7 \times 9\frac{1}{2}$ sq. in. = 133 sq. in., area of two sides;
$2 \times 4 \times 9\frac{1}{2}$ " " = 76 " " " " the other two sides;
$2 \times 4 \times 7$ " " = 56 " " " " two ends.
265 " " " " box.

24. 763 × 763 sq. ft. = 582,169 sq. ft. = 13.3647 + A.

25

$\frac{1}{2}$ sq. ft. = $\frac{1}{2}$ of 144 sq. in. = 72 sq. in.
$\frac{1}{2}$ ft. square = 6 in. square = 6 × 6 sq. in. = 36 " "
Difference, 36 " "

26

120 ft. = 40 yd., and 64 ft. 6′ = $21\frac{1}{2}$ yd.
$21\frac{1}{2} \times 40$ sq. yd. = 860 sq. yd., floor area.
2 sq. yd. for 5 persons = $\frac{2}{5}$ sq. yd. for 1 person.
860 sq. yd. = 860 persons at 1 sq. yd. for 1 person;
860 persons ÷ $\frac{2}{5}$ = 2,150 persons.

27 ***Page 232.***

15 ft. 9′ = 7 breadths each $\frac{3}{4}$ yd. wide.
22 ft. 6′ = $7\frac{1}{2}$ yd., length of each breadth.
7 × $7\frac{1}{2}$ yd. = $52\frac{1}{2}$ yd.; and $52\frac{1}{2}$ × $ .95 = 49.87\frac{1}{2}$.

28

$2\frac{3}{4}$ × $8\frac{1}{2}$ sq. yd. = $23\frac{3}{8}$ sq. yd.
$23\frac{3}{8}$ × 1.12\frac{1}{2}$ = 26.29\frac{11}{16}$ = $26.30.

29

288 sq. ft. = 288 ft. wide and 1 ft. long.
288 ft. wide ÷ 18 = 16 ft. wide.

30. 18 × ($10\frac{1}{2}$′ + $7\frac{1}{4}$′ =) $17\frac{3}{4}$′ = $319\frac{1}{2}$′ = $8\frac{7}{8}$ yd.

31

16 ft. = 192 in., length of board.
12 sq. ft. = 1,728 sq. in., area of board.
1,728 sq. in. = 1,728 in. wide and 1 in. long.
1,728 in. wide ÷ 192 = 9 in. wide.

32 ***Page 233.***

A cover 2 ft. 8′ square is 32′ square.
32 × 32 sq. in. = 1,024 sq. in., area of cover.
1,024 sq. in. = 1,024 in. long and 1 in. wide.
1,024 in. long ÷ 8 = 128 in. long = 10 ft. 8 in. long.

33

120 A. = 19,200 sq. rd. = 19,200 rd. long and 1 rd. wide.
19,200 rd. long ÷ 32 = 600 rd. long.

34

$\frac{3}{4}$ × 64 sq. yd. = 48 sq. yd. = 432 sq. ft., area of carpet.
432 sq. ft. = 432 ft. wide and 1 ft. long.
432 ft. wide ÷ 24 = 18 ft. wide.

35

3 ft. 3 in. = 39 in.; 2 sq. yd. 2 sq. ft. 84 sq. in. = 2,964 sq. in.
2,964 sq. in. = 2,964 in. long and 1 in. wide.
2,964 in. long ÷ 39 = 76 in. long = 6 ft. 4 in. long.

36

2 pickets are required for 1 foot of fence.
(2 × 15 rd.) + (2 × 16 rd.) = 62 rd. = 1,023 ft., length of fence.
1,023 × 2 pickets = 2,046 pickets.

Page 233.

37

Each gable is a triangle whose base is 32 ft. and altitude 9 ft.
The area of the two gables equals the area of a rectangle 32 ft. long and 9 ft. wide.

$$9 \times 32 \text{ sq. ft.} = 288 \text{ sq. ft.}$$

38

$$\frac{56 \times 141 \text{ sq. rd.}}{2} = 3{,}948 \text{ sq. rd.} = 24 \text{ A. } 108 \text{ sq. rd.}$$

39

2 × 108 sq. ft. = 216 sq. ft., area of a rectangle 9 ft. wide.
216 sq. ft. = 216 ft. long and 1 ft. wide.
216 ft. long, or base, ÷ 9 = 24 ft. long, base of triangle.

40

$$\frac{13 \times 18 \text{ sq. ft.}}{2} = 117 \text{ sq. ft.} = 13 \text{ sq. yd.}$$

41

The block has 6 faces, each 10 inches square.
6 × 10 × 10 sq. in. = 600 sq. in. = 4 sq. ft. 24 sq. in.

42

$$\frac{64.7 \text{ rd.} + 135.3 \text{ rd.}}{2} = 100 \text{ rd.}, \left\{ \begin{array}{l} \text{average length of the} \\ \text{two parallel sides.} \end{array} \right.$$

100 A. = 16,000 sq. rd. = 16,000 rd. long and 1 rd. wide.
16,000 rd. long ÷ 100 = 160 rd. long, or distance between the parallel sides.

43

$$\frac{200 \text{ ft.} + 160 \text{ ft.}}{2} = 180 \text{ ft.} = 10\tfrac{10}{11} \text{ rd.}, \left\{ \begin{array}{l} \text{average length of the} \\ \text{two parallel sides.} \end{array} \right.$$

$3 \times 10\frac{10}{11}$ sq. rd. = $32\frac{8}{11}$ sq. rd., contents of lot.

44

2 × 24 × 32 sq. ft. = 1,536 sq. ft. of floor surface.

Multiplying this by $1\frac{1}{4}$ for board feet, and the resulting product by 1.25 for matched flooring, we have

$1.25 \times 1\frac{1}{4} \times 1{,}536$ sq. ft. = 2,400 sq. ft. = 2.4 M of lumber to be paid for.

2.4 × \$28 = \$67.20, cost of the lumber.

45 ***Page 234.***

$\frac{15 \text{ rd.} + \frac{1}{2} \text{ rd.}}{2} = 7\frac{3}{4}$ rd., average width of the field.

$7\frac{3}{4} \times 40$ sq. rd. $= 310$ sq. rd., area of the field.

46

$22.5 \times 6.4 \times 3.25$ cu. ft. $= 468$ cu. ft.

47

2 ft. $6' = 2\frac{1}{2}$ ft., and $3\frac{1}{4}' = \frac{13}{48}$ ft.
$\frac{13}{48} \times 2\frac{1}{2} \times 6$ cu. ft. $= 4$ cu. ft. 108 cu. in.

48

$60 \times 12\frac{1}{2}$ cu. ft. $=$ 750 cu. ft. of air breathed in 1 hour.
$12\frac{1}{2} \times 24 \times 32$ " " $= 9,600$ " " " " in the room.
9,600 cu. ft. would be breathed in 9,600 h., at 1 cu. ft. per h.
9,600 h. $\div$ 750 $= 12\frac{4}{5}$ h.

49

120 rd. $=$ 660 yd., and 30 ft. $=$ 10 yd.
10×660 cu. yd. $= 6,600$ cu. yd. in a mill-race 660 yd. long, 10 yd. wide, and 1 yd. deep; and
5,500 cu. yd. (removed in digging the given mill-race) $= \frac{5500}{6600} = \frac{5}{6}$ of the number of cubic yards removed in digging a mill-race 1 yd. deep.
Hence, the mill-race was $\frac{5}{6}$ yd. or 2 ft. 6′ deep.

50

$(4 \times 8 =)$ 32 sq. ft. $=$ the face measure of 1 cd. of 4-foot wood.
100×32 " " $= 3,200$ sq. ft., face measure of 100 cd.
24 rd. $=$ 396 ft.; 3,200 sq. ft. $=$ 3,200 ft. high and 1 ft. long.
3,200 ft. high $\div$ 396 $= 8\frac{8}{99}$ ft. high.

51

$5.5 \times 8 \times 12\frac{2}{3}$ cu. ft. $= 557\frac{1}{3}$ cu. ft., capacity of bin.
$557\frac{1}{3} \times .8$ bu. $= 445.8\frac{2}{3}$ bu. of barley.
$557\frac{1}{3} \times .64$ " $= \underline{356.69\frac{1}{3}}$ " " corn in the ear.
$89\frac{13}{75}$ " more of barley.

52

14×22 sq. in. $= 308$ sq. in. covered by 1 sheet of tin.
3.5 squares $=$ 350 sq. ft. $=$ 50,400 sq. in. of roof to be covered.
50,400 sq. in. $=$ 50,400 sheets each covering 1 sq. in.
50,400 sheets $\div$ 308 $= 163\frac{7}{11}$ sheets.

Page 234. **53**

(2 × 18 ft.) + (2 × 16 ft.) = 68 ft., length of the walls.

9.5 × 68 sq. ft. = 646 sq. ft. = $71\frac{7}{9}$ sq. yd. of walls and openings.
16 × 18 " " = 288 " " = 32 " " " ceiling.
Surface to be plastered, } 934 " " = $103\frac{7}{9}$ " "

(2 × 3 × 6 sq. ft.) + (3 × $3\frac{1}{2}$ × $7\frac{1}{2}$ sq. ft.) = $114\frac{3}{4}$ sq. ft. = $12\frac{3}{4}$ sq. yd. of openings.

$71\frac{7}{9}$ sq. yd. of walls − $12\frac{3}{4}$ sq. yd. of openings = $59\frac{1}{36}$ sq. yd. to be papered.

9 × $\frac{1}{2}$ sq. yd. = $4\frac{1}{2}$ sq. yd. 1 roll of paper covers.
$59\frac{1}{36}$ sq. yd. = $59\frac{1}{36}$ rolls of 1 sq. yd. each.
$59\frac{1}{36}$ rolls ÷ $4\frac{1}{2}$ = $13\frac{1}{9}$ rolls of paper required.

$103\frac{7}{9}$ sq. yd. of plastering	@	$ .25	25.94\frac{4}{9}$
$13\frac{1}{9}$ rolls of paper-hanging	"	.50	6.55$\frac{5}{9}$
Total cost of plastering and paper-hanging,			$32.50

54

$2\frac{5}{8}$ mi. = 4,620 yd., 5 ft. = $1\frac{2}{3}$ yd., and 12 ft. = 4 yd.
4 × $1\frac{2}{3}$ × 4,620 cu. yd. = 30,800 cu. yd.
$6,468 ÷ 30,800 = $ .21.

55

27 ft. = 9 yd., 19 ft. = $6\frac{1}{3}$ yd., and 7 ft. = $2\frac{1}{3}$ yd.
$2\frac{1}{3}$ × $6\frac{1}{3}$ × 9 cu. yd. = 133 cu. yd., excavation.
133 × $ .18 = $23.94.

56

9 × 10 × 20 cu. ft. = 1,800 cu. ft. = 3,110,400 cu. in.
3,110,400 cu. in. = 13,464$\frac{216}{231}$ gal. = 427$\frac{247}{539}$ bar.

Page 235. **57**

30 × 40 × 144 cu. in. = 172,800 cu. in. of water will cover the roof 1 in. deep.
80 × 63 × 231 cu. in. = 1,164,240 cu. in. in an 80-hhd. cistern.
1,164,240 cu. in. = 1,164,240 in. deep on 1 sq. in.
1,164,240 in. deep ÷ 172,800 = $6\frac{59}{80}$ in. deep on 172,800 sq. in.

58

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(2 × 60 ft.) + (2 × 40 ft.) = 200 ft., total length of walls.
46 ft. 6′ − 28 ft. = 18 ft. 6′, height of gables.
1 × 28 × 200 cu. ft. = 5,600 cu. ft. in walls.
1 × 40 × $18\frac{1}{2}$ “ “ = 740 “ “ “ gables.
In walls and gables, 6,340 “ “ including openings.

1 × 7 × 12 cu. ft. = 84 cu. ft. in (*a*)
2 × $8\frac{1}{6}$ × $8\frac{1}{2}$ “ “ = $138\frac{5}{6}$ “ “ “ (*b*)
10 × 3 × $8\frac{1}{2}$ “ “ = 255 “ “ “ (*c*)
10 × 3 × $7\frac{1}{2}$ “ “ = 225 “ “ “ (*d*)
$\frac{1}{2}$ of the openings = $702\frac{5}{6}$ “ “ ÷ 2 = $351\frac{5}{12}$ cu. ft.

6,340 cu. ft. − $351\frac{5}{12}$ cu. ft. = $5,988\frac{7}{12}$ cu. ft. of brick work.
$5,988\frac{7}{12}$ × $22\frac{1}{2}$ bricks = $134,743.1\frac{1}{8}$ bricks = 134,744 bricks.

59

1 cu. ft. = 27 bricks piled solid, or $22\frac{1}{2}$ bricks and mortar.

The volume of 27 bricks − $22\frac{1}{2}$ bricks = $4\frac{1}{2}$ bricks = $\frac{4\frac{1}{2}}{27}$ = $\frac{1}{6}$ of each cu. ft. of brick wall is mortar.

60

$4\frac{1}{2}$ bricks laid flatwise cover 1 sq. ft.
40 × (3 rd. =) $49\frac{1}{2}$ sq. ft. = 1,980 sq. ft. = 220 sq. rd.
1,980 × $4\frac{1}{2}$ bricks = 8,910 bricks = 8.91 M bricks.

8.91 × $7.50 = $ $66.82\frac{1}{2}$ for bricks.
220 × $.33\frac{1}{3}$ = $73.33\frac{1}{3}$ “ labor.
Contractor will receive $140.16

61

$1\frac{1}{2}$ × 8 × 72 cu. ft. = 864 cu. ft. = 32 cu. yd. of wall.
864 ft. at 22 cu. ft. to the perch = $39\frac{3}{11}$ perches of stone.

$39\frac{3}{11}$ × $ $.93\frac{3}{4}$ = $$36.81\frac{9}{11}$ for the stone.
32 × 1.25 = 40 “ “ mason work.
Total cost, $76.82

62

9′ = $\frac{3}{4}$ ft.
9 × 2 × $\frac{3}{4}$ × 13 sq. ft. = $175\frac{1}{2}$ sq. ft. = .1755 M board ft. of joists.
.1755 × $14.50 = $2.54.

Page 235.

63

12 × 22 × 35 cu. ft. = 9,240 cu. ft. in body of stack.
$\frac{15}{2}$ × 22 × 35 “ “ = 5,775 “ “ “ top “ “
In the stack are 15,015 “ “ = 55$\frac{11}{18}$ T.

64

1½ × 32 × 48 sq. ft. = 2,304 sq. ft. in school-room floor.
1½ × 16 × 16 “ “ = 384 “ “ “ class-room “
2,688 “ “ “ the two floors.
Add .25, or 672 “ “ for matched lumber.
3,360 ft. of lumber required.

65

$\frac{14 \text{ in.} + 0 \text{ in.}}{2}$ = 7 in. = $\frac{7}{12}$ ft., average width of the 8 boards.
8 × $\frac{7}{12}$ × 18 sq. ft. = 84 sq. ft. = .084 M ft. of lumber.
.084 × $16.25 = $1.36½.

Page 236.

66

2 × 19 × 28 sq. ft. = 1,064 sq. ft. = 1.064 M board ft. of plank.
1.064 × $17.50 = $18.62.

67

ft. 9′ = 9¾ ft.; 3 ft. 4′ = 3⅓ ft.; 2 ft. 2′ = 2⅙ ft.
2⅙ × 3⅓ × 9¾ cu. ft. = 70$\frac{5}{12}$ cu. ft., capacity of wagon box.
70$\frac{5}{12}$ × .8 bu. = 56⅓ bu. of wheat.
70$\frac{5}{12}$ × .64 “ = 45$\frac{1}{15}$ “ “ potatoes.

68

21.5 × 29.5 sq. ft. = 634¼ sq. ft. = 70$\frac{17}{36}$ sq. yd. of floor.
70$\frac{17}{36}$ × $1.15 = $81.04.

69

16′ = 1⅓ ft., and 20′ = 1⅔ ft.
1⅓ × 1⅔ × 32 cu. ft. = 71$\frac{1}{9}$ cu. ft. = .71$\frac{1}{9}$ C timber feet.
.71$\frac{1}{9}$ × $18 = $12.80.

70

$\frac{11 \text{ ft.} + 7 \text{ ft.}}{2}$ = 9 ft., average width of abutments.
2 × 9 × 15 × 24 cu. ft. = 6,480 cu. ft. = 392$\frac{8}{11}$ perches.
392$\frac{8}{11}$ × $1.18¾ = $466.36.

71

Page 236.

$\frac{2\text{ ft.} + 1\text{ ft.}}{2} = 1\frac{1}{2}$ ft., average thickness of wall.

3 ft. 6′ = 3½ ft., and 72 rd. = 1,188 ft.
1½ × 3½ × 1,188 cu. ft. = 6,237 cu. ft. = $48\frac{93}{128}$ cd. of stone.

72

1 rd. = 5½ yd., and 33 ft. = 11 yd.
5½ × 5½ × 11 cu. yd. = 332¾ cu. yd. = $88\frac{11}{15}$ T.

73

7½ × 8 × 15 cu. ft. = 900 cu. ft., capacity of coal-house.
It will store 900 × .64 bu. = 576 bu. of coal.

74

(*1*) Measure the dimensions of the walls and ceiling, and compute the area in sq. yd.
(*2*) Measure the dimensions of the several openings, compute their areas in sq. yd., and subtract ½ of the result from the entire area of walls and ceiling.
(*3*) Find the cost of the lath @ 40¢ per bunch.
(*4*) Find the cost of lathing and plastering @ 22¢ per sq. yd.
(*5*) Find the sum of the results of (*3*) and (*4*).

75

3⅔ × 5 × 7 cu. ft. = 128⅓ cu. ft., capacity of given bin.
2¼ × 128⅓ cu. ft. = 288¾ cu. ft. = 288¾ ft. long, 1 ft. wide, and
288¾ ft. long ÷ (6¼ × 4½ =) 28⅛ = 10 ft. 3⅕ in. long. [1 ft. deep.

76

12 cu. ft. 587.1 cu. in. = 21,323.1 cu. in. = 21,323.1 in. long, 1 in. wide, and 1 in. deep.
21,323.1 in. long ÷ (18½ × 28¼ =) 522⅝ = 40⅘ in. long, inside measurement.
18½′ + 2′ = 20½′ deep; 28¼′ + 2′ = 30¼′ wide; 40⅘′ + 2′ = 42⅘′ long.

CHAPTER VII.

PERCENTAGE.—THE FIVE GENERAL CASES.

Page 239.

1. $8\% = .08;\ 475 \text{ sheep} \times .08 = 38 \text{ sheep}.$

2. $88\% = .88;\ 125 \text{ pupils} \times .88 = 110 \text{ pupils}.$

3. $7\frac{1}{2}\% = .07\frac{1}{2};\ 44 \text{ gal.} \times .07\frac{1}{2} = 3.3 \text{ gal}.$

4. $\left\{\begin{array}{l} 1 \text{ Tp.} = 23{,}040 \text{ A.} \\ 23{,}040 \text{ A.} \times .62\frac{1}{2} = 14{,}400 \text{ A.} \end{array}\right.$

5. $9{,}875 \text{ bu.} \times .12\frac{1}{2} = 1{,}234\frac{3}{8} \text{ bu.}$

6. $63{,}000 \text{ riflemen} \times .11\frac{2}{3} = 7{,}350 \text{ riflemen}.$

7

$$\begin{array}{l} .33 + .46 = .79;\ 1 - .79 = .21; \\ 6{,}250 \text{ T.} \times .33 = 2{,}062\frac{1}{2} \text{ T., Lehigh;} \\ 6{,}250 \text{ ''} \times .46 = 2{,}875 \text{ '' Lackawanna;} \\ 6{,}250 \text{ ''} \times .21 = 1{,}312\frac{1}{2} \text{ '' Pittston.} \end{array}$$

8

$$6{,}319 \text{ bu.} \times .12\frac{1}{2} = 789\frac{7}{8} \text{ bu.}$$

Page 240.

1

$\$15 \div 250 = \$.06 = 6\%$

2

$25 \text{ bu.} \div 5{,}000 = .005 \text{ bu.} = \frac{1}{2}\%$

Page 241.

3

$18 \text{ bu.} \div 270 = .06\frac{2}{3} \text{ bu.} = 6\frac{2}{3}\%$

4

$270 \text{ bu.} \div 18 = 15 \text{ bu.} = 1{,}500\%$

5

$95 \text{ sheep} \div 475 = .2 \text{ sheep} = 20\%$

6

$\$119 \div 340 = \$.35 = 35\%$

7

$\$600 \div 7{,}500 = \$.08 = 8\%$

8

$45 \text{ trees} \div 250 = .18 \text{ tree} = 18\%$

9. $975 \text{ A.} \div 12{,}350 = .07\frac{17}{19} \text{ A.} = 7\frac{17}{19}\%$

10. $5{,}359 \text{ oranges} \div 85{,}744 = .06\frac{1}{4} \text{ orange} = 6\frac{1}{4}\%$

Page 242.

1

169 T. ÷ .13 = 1,300 T.

2

11.5 mi. ÷ $.12\frac{1}{2}$ = 92 mi.

3

\$500 ÷ .18 = $\$2,777\frac{7}{9}$

4

\$237.50 ÷ $.12\frac{1}{2}$ = \$1,900

5

10 sacks ÷ .005 = 2,000 sacks.

6

\$ .09 ÷ .80 = $\$\,.11\frac{1}{4}$

7

115 pupils ÷ .92 = 125 pupils.

8

7.5 sq. rd. ÷ .06 = 125 sq. rd.

9

$\$\,.30\frac{1}{4}$ ÷ 1.2 = $\$\,.25\frac{5}{24}$

10

$\frac{1}{4}$ lb. ÷ $.07\frac{1}{2}$ = $3\frac{1}{3}$ lb.

Page 243.

1

1 + .25 = 1.25
\$6.72 × 1.25 = \$8.40

2

1 − .18 = .82
\$600 × .82 = \$492

3

1 + $.37\frac{1}{2}$ = $1.37\frac{1}{2}$
\$ .60 × $1.37\frac{1}{2}$ = $\$\,.82\frac{1}{2}$

4

1 − $.62\frac{1}{2}$ = $.37\frac{1}{2}$
\$876 × $.37\frac{1}{2}$ = \$328.50

5

1 − $.66\frac{2}{3}$ = $.33\frac{1}{3}$
\$800 × $.33\frac{1}{3}$ = $\$266\frac{2}{3}$

Page 244.

1

1 + .20 = 1.20
\$544 ÷ 1.20 = \$450

2

1 − .20 = .80
\$270 ÷ .80 = \$337.50

3

1 + .42 = 1.42
\$2,662.50 ÷ 1.42 = \$1,875

4

1 − .60 = .40
\$56 ÷ .40 = \$140, monthly income;
\$140 × 12 = \$1,680, yearly "

5

1 + .08 = 1.08
\$1,890 ÷ 1.08 = \$1,750

6

1 + .40 = 1.40
\$126 ÷ 1.40 = \$90

7

1 + $.02\frac{1}{2}$ = $1.02\frac{1}{2}$
44 yd. ÷ $1.02\frac{1}{2}$ = $42\frac{38}{41}$ yd.

PROFIT AND LOSS.

Page 246.

1

$\$2.50 \times .10 = \$.25$

2

$\$7.25 \times .08 = \$.58$

3

$\$.16 \times .56\frac{1}{4} = \$.09$

4

$\$160 \times 2.12\frac{1}{2} = \$340$

5

$\$187.50 \times .12\frac{1}{2} = \$23.43\frac{3}{4}$

6

$\$.31\frac{1}{4} \times .20 = \$.06\frac{1}{4}$

7

$\$.40 \times 1.62\frac{1}{2} = \$.65$

8

$\$1.20 \times .66\frac{2}{3} = \$.80$

9

$196 \text{ lb.} \times 1.40 = 274.4 \text{ lb.}$

10

$\$.78 \times .85 = \$.663$

11

$\$2.60 \times .80 = \$2.08$

Page 247.

12

$\$2.60 \times 1.25 = \$3.25$

13

$\$1.25 \times 1.60 = \$2$

14

$\$.93\frac{3}{4} \times .90\frac{2}{3} = \$.85$

15

$\$.87\frac{1}{2} \div 10.50 = \$.08\frac{1}{3} = 8\frac{1}{3}\%$

16

$\$.02\frac{1}{2} \div .15 = \$.16\frac{2}{3} = 16\frac{2}{3}\%$

17

$\$7.31 - \$6.56 = \$.75$, percentage;
$\$.75 \div 6.56 = \$.11\frac{71}{164} = 11\frac{71}{164}\%$

18

$\frac{4}{5} - \frac{3}{5} = \frac{1}{5}$, percentage;
$\frac{1}{5} \div \frac{3}{5} = .33\frac{1}{3} = 33\frac{1}{3}\%$

19

Paid $\frac{6}{5}$ of $100\% = 120\%$;
Sold for $100\% - 10\% = 90\%$;
Lost $120\% - 90\% = 30\%$
$.30 \div 1.20 = .25 = 25\%$ lost.

20

$\$5 - \$4.25 = \$.75$
$\$.75 \div 4.25 = \$.17\frac{11}{17} = 17\frac{11}{17}\%$

21

$\$.37\frac{1}{2} - \$.30 = \$.07\frac{1}{2}$
$\$.07\frac{1}{2} \div .37\frac{1}{2} = \$.20 = 20\%$

22

$1 + .15 = 1.15$
$\$112.50 \div 1.15 = \$97.83$

23

$1 - .10 = .90$
$\$187.50 \div 90 = \$208.33\frac{1}{3}$

24

$1 + .40 = 1.40$
$\$.90 \div 1.40 = \$.64\frac{2}{7}$

COMMISSION.

Page 248.

1

$415 × .05 = $20.75

2

$8,362.50 × .025 = $209.06¼

3

$2,275 × .02 = $45.50

4

$1,975 × .03 = $59.25

5

$ .37½ × 8,040 = $3,015, cost of wool;
$3,015 × .025 = $75.37½, commission.

6

$ .11½ × 15,000 = $1,725, for sheeting;
$1,725 × .01⅛ = $19.40⅝, commission.

7

$29.80 ÷ 238.40 = $ .12½ = 12½%

8

$56.33 ÷ 2,319 = $ .02$\frac{995}{2319}$ = 2$\frac{995}{2319}$%

9

1 + .05 = 1.05;
$1,390 ÷ 1.05 = $1,323.81, for investment;
$1,390 − $1,323.81 = $66.19, commission.

10

1 + .03⅓ = 1.03⅓;
$12,400 ÷ 1.03⅓ = $12,000, investment;
$12,400 − $12,000 = $400, commission.

11

1 + .02½ = 1.025
$2,630 ÷ 1.025 = $2,565.85

12

1 + .02 = 1.02
$5,600 ÷ 1.02 = $5,490.20

13

1 + .04 = 1.04;
$6,500 ÷ 1.04 = $6,250, to invest in hops;
$6,250 = 6,250 lb. of hops at $1 per lb.
6,250 lb. ÷ .31¼ = 20,000 lb.

14

$41.70 ÷ .15 = $278

15

$450.30 ÷ .075 = $6,004

16

$123.75 ÷ .05 = $2,475

INSURANCE.

Page 249. **1.** $\$2,250 \times .04 = \$90$, premium.

2. $\$6,287 \times .00\frac{5}{8} = \$39.29\frac{3}{8}$, prem.

3. $\$1,950 \times .01\frac{1}{2} = \$29.25$, prem.

4. $\$3,750 \times .00\frac{1}{4} = \$9.37\frac{1}{2}$, prem.

5. $\$2,250 \times .03\frac{3}{4} = \$84.37\frac{1}{2}$, prem.

6. $\$9,000 \times .00\frac{1}{2} = \$45$, prem.

7. $\$97,500 \times .00\frac{3}{4} = \$731.25$, prem.

8. $\$31.25 \div 12,500 = \$\ .0025 = \frac{1}{4}\%$

9. $\$97.50 \div 6,500 = \$\ .01\frac{1}{2} = 1\frac{1}{2}\%$

10. $\$37.50 \div 7,500 = \$\ .005 = \frac{1}{2}\%$

11. $\$50 \div 2,500 = \$\ .02 = 2\%$

Page 250. **12.** $\$9.50 \div .00\frac{3}{4} = \$1,266.66\frac{2}{3}$, valuation.

13. $\$28.12\frac{1}{2} \div .00\frac{5}{8} = \$4,500$, val. | **14.** $\$9.75 \div .005 = \$1,950$

TAXES.

1

$\$2,875 \times .013 = \$37.37\frac{1}{2}$, tax.

2

$\$932 \times .004 = \$3.728$, tax.

3

$\$3.57 \div 277.50 = \$\ .01\frac{53}{185} = 1\frac{53}{185}\%$

4

$\$12 \div 3,200 = \$\ .00375 = \frac{3}{8}\%$

5

$\$1,875 \div 500,000 = \$\ .00375 = \frac{3}{8}\%$

6

$.00\frac{3}{8}$, rate of tax without collector's fees.

$.00\frac{3}{8} \times 1.05 = .003\frac{15}{16}$, rate of tax with collector's fees.

$\$1,250 \times .003\frac{15}{16} = \$4.92$, A's tax;

$1,500 \times .003\frac{15}{16} = 5.91$, B's "

$2,250 \times .003\frac{15}{16} = 8.86$, C's "

$750 \times .003\frac{15}{16} = 2.95$, D's "

$4,250 \times .003\frac{15}{16} = 16.73$, E's "

7

$1\frac{7}{100}\% = .0107$, rate.

$\$15.25 \div .0107 = \$1,425.23$

8

$\$23.375 \div .0025 = \$9,350$

9

	Capital.	*Tax.*
1st partner's,	$3,300 × .02 =	$66
2d "	450 × .02 =	9
3d "	1,200 × .02 =	24
4th "	2,250 × .02 =	45
5th "	750 × .02 =	15
6th "	1,800 × .02 =	36
7th "	600 × .02 =	12
8th "	900 × .02 =	18
Total,	$11,250	

$\$225 \div 11,250 = \$\ .02 = 2\%$, rate of tax.

CUSTOMS AND DUTIES.

1 ***Page 252.***

225 × 33⅓ lb. = 7,500 lb.
Less 25%, tare, = 1,875 "
Net weight, 5,625 "
5,625 × $ .02½ = $140.62½, duties.

2

316 × $3.45 = $1,090.20, invoice.
$1,090.20 × .20 = $218.04, duties.

3

25 × 65 yd. = 1,625 yd.;
1,625 × $ .43¾ = $710.93¾, invoice.
1,625 × $ .44 = $715.—, specific duties;
$710.93¾ × .35 = 248.83, ad valorem duties.
$963.83, total duties.

4

Gross weight, 72 × 975 lb. = 70,200 lb.
Less 12½%, tare, = 8,775 "
Net weight, 61,425 "
61,425 × $ .06⅛ = $3,762.28, invoice price.
61,425 × $ .02 = $1,228.50, specific duties;
$3,762.28 × .25 = 940.57, ad valorem duties.
Custom-house charges, $2,169.07

STOCKS.

1

1 + .07⅝ = 1.07⅝
$100 × 1.07⅝ = $107⅝

2 ***Page 253.***

1 − .16 = .84
$100 × .84 = $84

3

7 × $100 = $700, par value of 7 shares;
$700 × .05⅛ = $35.87½, premium.

Page 253. **4**

$35 \times \$100 = \$3{,}500$, par value of 35 shares;
$\$3{,}500 \times .03\frac{1}{16} = \$107.18\frac{3}{4}$, discount.

5

$\$100 \times 1.15 = \$115$
$75 \times \$115 = \$8{,}625$, cost of 75 shares.

6

$\$8{,}982.75 = 8{,}982.75$ shares at \$1 per share;
$8{,}982.75$ shares $\div\ 103\frac{1}{4} = 87$ shares.

7

$\$2{,}346.87\frac{1}{2} = 2{,}346.875$ shares at \$1 per share;
$2{,}346.875$ shares $\div\ 93.875 = 25$ shares.

8

$\$100 - \$94 = \$6$;
$\$6 \div 94 = \$\,.06\frac{18}{47} = 6\frac{18}{47}\%$

9

$\$80 - \$75 = \$5$, loss.
$\$5 \div 80 = \$\,.06\frac{1}{4} = 6\frac{1}{4}\%$

10

$\$100 - \$32\frac{1}{8} = \$67\frac{7}{8}$, market value of 1 share;
$50 \times \$\,.67\frac{7}{8} = \$3{,}393.75$, market value of 50 shares.

11

$15 \times \$116\frac{1}{8} = \$1{,}741.87\frac{1}{2}$, cost.

12

$\$937.50 = 937.50$ shares at \$1 per share;
937.50 shares $\div\ (100 - 87\frac{1}{2} =)\ 62.50 = 15$ shares.

PARTNERSHIP.

Page 255. **1**

$\$3{,}500 + \$5{,}000 = \$8{,}500$, capital;
$\$2{,}450 \div 8{,}500 = \$\,.28\frac{14}{17} = 28\frac{14}{17}\%$, gain;
$\$3{,}500 \times .28\frac{14}{17} = \$1{,}008.82$, Reed's share;
$\$5{,}000 \times .28\frac{14}{17} = \$1{,}441.18$, Clark's share.

2 ***Page 255.***

5 mo. + 7 mo. + 6 mo. = 18 mo.

$22.50 ÷ 18 = $1.25 per mo. for pasture;
5 × $1.25 = $6.25, A's share;
7 × $1.25 = $8.75, B's "
6 × $1.25 = $7.50, C's "

3

$9,000 + $7,200 + $6,000 + $5,400 = $27,600, insurance.

$15,180 ÷ 27,600 = $ .55, = 55% of loss;
$9,000 × .55 = $4,950, loss sustained by Hanover Co.;
$7,200 × .55 = $3,960, " " " Globe Co.;
$6,000 × .55 = $3,300, " " " Ætna Co.;
$5,400 × .55 = $2,970, " " " Franklin Co.

4 ***Page 256.***

	Capital.		*Loss.*
Bates's,	$1,200	× .29$\frac{4}{7}$ =	$354.86
Davis's,	1,600	× .29$\frac{4}{7}$ =	473.14
Totals,	$2,800		$828

Loss, $828 ÷ 2,800 = $ .29$\frac{4}{7}$ = 29$\frac{4}{7}$%

5

Total capital, $75,000; total profits, $18,600.

H's share of the capital may be represented by 1 = $\frac{6}{6}$
Then, G's " " " " will " " " $\frac{2}{3}$ = $\frac{4}{6}$
And K's " " " " " " " " $\frac{1}{2}$ of $\frac{10}{6}$ = $\frac{5}{6}$
And the total capital " " " " 2$\frac{1}{2}$

i. e., for $1 of H's capital, G has $$\frac{2}{3}$ and K has $$\frac{5}{6}$.

$18,600 ÷ 75,000 = $ .24$\frac{4}{5}$; hence, the profits are 24$\frac{4}{5}$%.

Capitals.	*Dividends.*
H's = $75,000 ÷ 2$\frac{1}{2}$ = $30,000	$30,000 × .24$\frac{4}{5}$ = $7,440
G's = $30,000 × $\frac{2}{3}$ = $20,000	$20,000 × .24$\frac{4}{5}$ = $4,960
K's = $30,000 × $\frac{5}{6}$ = $25,000	$25,000 × .24$\frac{4}{5}$ = $6,200

Page 256.

6

H furnished 6,000 bales−(2,100 bales+1,250 bales+1,725 bales=) 5,075 bales = 925 bales.

1,920 bales ÷ 6,000 = .32 bale = 32% thrown overboard.

2,100 bales × .32 = 672 bales, E's share of the loss.
1,250 " × .32 = 400 " F's " " " "
1,725 " × .32 = 552 " G's " " " "
925 " × .32 = 296 " H's " " " "

7

Capital. *Profits.*
W's, $3,000 × 3.9 = $11,700
J's, 6,750 × 3.9 = 26,325
B's, 8,250 × 3.9 = 32,175
Totals, $18,000 $70,200 ÷ 18,000 = $3.90 = 390%

8

8 men 7 days = 56 men 1 day = 56 days' work, A's share.
14 " 5 " = 70 " 1 " = 70 " " B's "
Total, 126 " "

$\frac{1}{6}$ of 945 bu.=157$\frac{1}{2}$ bu., and 157$\frac{1}{2}$ bu.÷126=1$\frac{1}{4}$ bu. for 1 day's work.
56 × 1$\frac{1}{4}$ bu. = 70 bu., A's share;
70 × 1$\frac{1}{4}$ " = 87$\frac{1}{2}$ " B's share.

9

A's dividend, $210 = $\frac{210}{850}$ = $\frac{21}{85}$ of total dividend;
$\frac{21}{85}$ of 100 shares = 24$\frac{12}{17}$ shares.
B's dividend, 400 = $\frac{400}{850}$ = $\frac{40}{85}$ of total dividend;
$\frac{40}{85}$ of 100 shares = 47$\frac{1}{17}$ shares.
C's dividend, 240 = $\frac{240}{850}$ = $\frac{24}{85}$ of total dividend;
$\frac{24}{85}$ of 100 shares = 28$\frac{4}{17}$ shares.
Total dividends, $850

10

25 horses 30 days = 750 horses 1 day;
20 " 42 " = 840 " 1 "
750 horses 1 day and 840 horses 1 day = 1,590 " 1 "

$50 ÷ 1,590 = $ .03$\frac{23}{159}$, cost of pasture for 1 horse 1 day;
750 × $ .03$\frac{23}{159}$ = $23.58, rent to be paid by Hilton;
840 × $ .03$\frac{23}{159}$ = $26.42, " " " " " Roberts.

11

Page 256.

A's capital = $\frac{7}{16}$ of \$20,400 = \$8,925
B's " = $\frac{3}{8}$ " 20,400 = 7,650
C's " = $\frac{3}{16}$ " 20,400 = 3,825
D's " = $\frac{2}{7}$ " 8,925 = 2,550

\$8,925 − \$2,550 = \$6,375 = A's capital after selling $\frac{2}{7}$ of it.

A
\$6,375 for 12 mo. = \$76,500 for 1 mo.
2,550 " 4 " = 10,200 " 1 "
Making \$86,700 " 1 "

B
$\frac{1}{3}$ of \$7,650 = \$2,550, that B sells to C, May 1.
\$7,650 − \$2,550 = \$5,100, capital invested for the year.
\$5,100 for 12 mo. = \$61,200 for 1 mo.;
2,550 " 4 " = 10,200 " 1 "
Making \$71,400 " 1 "

C
\$3,825 for 12 mo. = \$45,900 for 1 mo.
2,550 " 8 " = 20,400 " 1 "
Making \$66,300 " 1 "

D \$2,550 for 8 mo. = \$20,400 for 1 mo.

	Capital for 1 mo.		*Gain.*
A's,	\$86,700	× .03$\frac{269}{612}$ =	\$2,982$\frac{1}{12}$
B's,	71,400	× .03$\frac{269}{612}$ =	2,455$\frac{5}{6}$
C's,	66,300	× .03$\frac{269}{612}$ =	2,280$\frac{5}{12}$
D's,	20,400	× .03$\frac{269}{612}$ =	701$\frac{2}{3}$
Totals,	\$244,800		\$8,400 ÷ 244,800 = \$ .03$\frac{269}{612}$ = 3$\frac{269}{612}$%

12

C's share of the capital may be represented by 1
Then B's " " " " will " " " $\frac{1}{2}$
A's " " " " " " " " 2
D's " " " " " " " " 2$\frac{1}{2}$
And the total " " " " " 6

Of the total capital	Hence, the dividends are—
A's share, $\frac{2}{6}$ = $\frac{4}{12}$;	A's, $\frac{4}{12}$ of \$1,943.76 = \$647.92
B's " $\frac{1}{12}$;	B's, $\frac{1}{12}$ of \$1,943.76 = 161.98
C's " $\frac{1}{6}$ = $\frac{2}{12}$;	C's, $\frac{2}{12}$ of \$1,943.76 = 323.96
D's " $\frac{2\frac{1}{2}}{6}$ = $\frac{5}{12}$;	D's, $\frac{5}{12}$ of \$1,943.76 = 809.90

INTEREST.

Page 258.

1

$467, prin., × .06, rate of int., = $28.02, int. for 1 yr.

2

$321, prin., × .05, rate of int., = $16.05, int. for 1 yr.;
$321, prin., + $16.05, int., = $337.05, amt.

3

$167.50, prin., × .07, rate of int., = $11.725, int. for 1 yr.;
5 × $11.725 = $58.62½, " " 5 "

4

$612.75, prin., × .08, rate of int., = $49.02, int. for 1 yr.;
3 × $49.02 = $147.06 " " 3 "

5

$165.88, prin., × .10, rate of int., = $16.588, int. for 1 yr.;
$165.88, prin., + $16.588, int., = $182.47, amt.

6

$3,750, prin., × .05, rate of int., = $187.50, int. for 1 yr.;
3 × $187.50 = $ 562.50, int. for 3 yr.;
3,750.—, prin.
$4,312.50, amt.

7

From Feb. 11, 1880, to Feb. 11, 1883 = 3 yr.
$2,250, prin., × .06, rate of int., = $135, int. for 1 yr.;
3 × $135 = $ 405, int. for 3 yr.
2,250, prin.
$2,655, amt.

8

$560.10, prin., × .07, rate of int., = $39.207, int. for 1 yr.;
2 × $39.207 = $78.41, " " 2 "

Page 260.

1

$952.17 × .06 = $57.13, int. for 1 yr.;

$$\frac{\$57.13 \times 3}{12} = \$14.28, \text{ int. for 3 mo.}$$

Page 260.

2

$\$187.75 \times\ 04 = \$7.51$, int. for 1 yr.;

$\frac{\$7.51 \times 5}{12} = \$3.13$, int. for 5 mo.

3

Time, 1 yr 4 mo. = 16 mo.

$\$1{,}168.48 \times .03\frac{1}{2} = \$40.90$, int. for 1 yr.;

$\frac{\$40.90 \times 16}{12} = \$54.53$, int. for 1 yr. 4 mo.

4

Time, 4 yr. 10 mo. = 58 mo.

$\$938.25 \times .06 = \$56.295$, int. for 1 yr.;

$\frac{\$56.295 \times 58}{12} = \$272.09$, int. for 4 yr. 10 mo.

5

$\$294.25 \times .05 = \$14.71$, int. for 1 yr.;

$\frac{\$14.71 \times 6}{12} = \$\ \ 7.36$, int. for 6 mo.

294.25, prin.

$301.61, amt.

6

Time, 1 yr 1 mo. = 13 mo.

$\$3{,}275 \times .07 = \$229.25$, int. for 1 yr.;

$\frac{\$229.25 \times 13}{12} = \$\ \ 248.35$, int. for 1 yr. 1 mo.;

3,275.—, prin.

$3,523.35, amt.

7

$\$2{,}732 \times .12 = \$327.84$, int. for 1 yr.;

$\frac{\$327\ 84}{12} = \$\ \ 27.32$, int. for 1 mo.

2,732.—, prin.

$2,759.32, amt.

8

Time, 1 yr. 4 mo. = 16 mo.

$\$3{,}150 \times .07 = \$220.50$, rent for 1 yr.;

$\frac{\$220.50 \times 16}{12} = \$294$, rent for 1 yr. 4 mo.

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9

$\$1{,}730 \times .07 = \$121.10$, int. for 1 yr.;

$\frac{\$121.10}{2} = \$60.55$, semi-annual int.

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1

Time, 9 mo. 15 da. = 9.5 mo.

$\$1{,}296 \times .07 = \$90.72$, int. for 1 yr.;

$\frac{\$90.72 \times 9.5}{12} = \$71.82$, int. for 9 mo. 15 da.

2

Time, 1 yr. 24 da. = 12.8 mo.

$\$716.25 \times .06 = \$42.975$, int. for 1 yr.;

$\frac{\$42.975 \times 12.8}{12} = \$45.84$, int. for 1 yr. 24 da.

3

Time, 3 yr. 2 mo. 29 da. = $38\frac{29}{30}$ mo.

$\$936 \times .10 = \$93.60$, int. for 1 yr.;

$\frac{\$93.60 \times 38\frac{29}{30}}{12} = \$303.94$, int. for 3 yr. 2 mo. 29 da.

4

Time, 1 yr. 14 da. = $12.4\frac{2}{3}$ mo.

$\$718 \times .06 = \$43.08$, int. for 1 yr.;

$\frac{\$43.08 \times 12.4\frac{2}{3}}{12} = \$44.76$, int. for 1 yr. 14 da.

5

Time, 20 da. = $\frac{2}{3}$ mo.

$\$819 \times .08 = \$65.52$, int. for 1 yr.;

$\frac{\$65.52 \times \frac{2}{3}}{12} = \$3.64$, int. for 20 da.

6

Time, 1 yr. 15 da. = 12.5 mo.

$\$483.70 \times .07 = \$33.86$, int. for 1 yr.;

$\frac{\$33.86 \times 12.5}{12} = \$35.27$, int. for 1 yr. 15 da.

7

The result in this problem, depends

(*1*) Upon the time from Feb. 14 last to this date; and
(*2*) Upon the legal rate of interest in this State.

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1. Interest of \$387.50, at 10% for 5 years.

$$\$387.50 \times .10 = \$38.75, \text{ int. for 1 yr.};$$
$$\$38.75 \times 5 = \$193.75, \text{ int. for 5 yr.}$$

2. Interest of \$387.50, at 10% for 2 yr. 9 mo. = 33 mo.

$$\$387.50 \times .10 = \$38.75, \text{ int. for 1 yr.};$$
$$\frac{\$38.75 \times 33}{12} = \$106.56, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

3. Interest of \$387.50, at 10% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$387.50 \times .10 = \$38.75, \text{ int. for 1 yr.};$$
$$\frac{\$38.75 \times 19.7}{12} = \$63.61, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

4. Interest of \$387.50, at 10% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$387.50 \times .10 = \$38.75, \text{ int. for 1 yr.};$$
$$\frac{\$38.75 \times 11\frac{13}{30}}{12} = \$36.92, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

5. Interest of \$387.50, at 10% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$387.50 \times .10 = \$38.75, \text{ int. for 1 yr.};$$
$$\frac{\$38.75 \times 36\frac{14}{15}}{12} = \$119.26, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

6. Interest of \$387.50, at 7% for 5 years.

$$\$387.50 \times .07 = \$27.125, \text{ int. for 1 yr.};$$
$$\$27.125 \times 5 = \$135.63, \text{ int. for 5 yr.}$$

7. Interest of \$387.50, at 7% for 2 yr. 9 mo. = 33 mo.

$$\$387.50 \times .07 = \$27.125, \text{ int. for 1 yr.};$$
$$\frac{\$27.125 \times 33}{12} = \$74.59, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

8. Interest of \$387.50, at 7% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$387.50 \times .07 = \$27.125, \text{ int. for 1 yr.};$$
$$\frac{\$27.125 \times 19.7}{12} = \$44.53, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

9. Interest of \$387.50, at 7% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$387.50 \times .07 = \$27.125, \text{ int. for 1 yr.};$$
$$\frac{\$27.125 \times 11\frac{13}{30}}{12} = \$25.84, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

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10. Interest of \$387.50, at 7% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$387.50 \times .07 = \$27.125, \text{ int. for 1 yr.;}$$

$$\frac{\$27.125 \times 36\frac{14}{15}}{12} = \$83.48, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

11. Interest of \$387.50, at $4\frac{1}{2}$% for 5 years.

$$\$387.50 \times .04\tfrac{1}{2} = \$17.43\tfrac{3}{4}, \text{ int. for 1 yr.;}$$

$$\$17.43\tfrac{3}{4} \times 5 = \$87.19, \text{ int. for 5 yr.}$$

12. Interest of \$387.50, at $4\frac{1}{2}$% for 2 yr. 9 mo. = 33 mo.

$$\$387.50 \times .04\tfrac{1}{2} = \$17.43\tfrac{3}{4}, \text{ int. for 1 yr.;}$$

$$\frac{\$17.43\frac{3}{4} \times 33}{12} = \$47.95, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

13. Interest of \$387.50, at $4\frac{1}{2}$% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$387.50 \times .04\tfrac{1}{2} = \$17.43\tfrac{3}{4}, \text{ int. for 1 yr.;}$$

$$\frac{\$17.43\frac{3}{4} \times 19.7}{12} = \$28.63, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

14. Interest of \$387.50, at $4\frac{1}{2}$% for 11 mo. 18 da. = $11\frac{18}{30}$ mo.

$$\$387.50 \times .04\tfrac{1}{2} = \$17.43\tfrac{3}{4}, \text{ int. for 1 yr.;}$$

$$\frac{\$17.43\frac{3}{4} \times 11\frac{18}{30}}{12} = \$16.61, \text{ int. for } \frac{11\frac{18}{30}}{12} \text{ yr.}$$

15. Interest of \$387.50, at $4\frac{1}{2}$% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$387.50 \times .04\tfrac{1}{2} = \$17.43\tfrac{3}{4}, \text{ int. for 1 yr.;}$$

$$\frac{\$17.43\frac{3}{4} \times 36\frac{14}{15}}{12} = \$53.67, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

16. Interest of \$387.50, at 15% for 5 yr.

$$\$387.50 \times .15 = \$58.125, \text{ int. for 1 yr.;}$$

$$\$58.125 \times 5 = \$290.63, \text{ int. for 5 yr.}$$

17. Interest of \$387.50, at 15% for 2 yr. 9 mo. = 33 mo.

$$\$387.50 \times .15 = \$58.125, \text{ int. for 1 yr.;}$$

$$\frac{\$58.125 \times 33}{12} = \$159.84, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

18. Interest of \$387.50, at 15% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$387.50 \times .15 = \$58.125, \text{ int. for 1 yr.;}$$

$$\frac{\$58.125 \times 19.7}{12} = \$95.42, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

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19. Interest of $387.50, at 15% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$387.50 \times .15 = \$58.125, \text{ int. for 1 yr.};$$
$$\frac{\$58.125 \times 11\frac{13}{30}}{12} = \$55.38, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

20. Interest of $387.50, at 15% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$387.50 \times .15 = \$58.125, \text{ int. for 1 yr.};$$
$$\frac{\$58.125 \times 36\frac{14}{15}}{12} = \$178.90, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

21. Interest of $387.50, at 6% for 5 years.

$$\$387.50 \times .06 = \$23.25, \text{ int. for 1 yr.};$$
$$\$23.25 \times 5 = \$116.25, \text{ int. for 5 yr.}$$

22. Interest of $387.50, at 6% for 2 yr. 9 mo. = 33 mo.

$$\$387.50 \times .06 = \$23.25, \text{ int. for 1 yr.};$$
$$\frac{\$23.25 \times 33}{12} = \$63.94, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

23. Interest of $387.50, at 6% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$387.50 \times .06 = \$23.25, \text{ int. for 1 yr.};$$
$$\frac{\$23.25 \times 19.7}{12} = \$38.17, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

24. Interest of $387.50, at 6% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$387.50 \times .06 = \$23.25, \text{ int. for 1 yr.};$$
$$\frac{\$23.25 \times 11\frac{13}{30}}{12} = \$22.15, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

25. Interest of $387.50, at 6% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$387.50 \times .06 = \$23.25, \text{ int. for 1 yr.};$$
$$\frac{\$23.25 \times 36\frac{14}{15}}{12} = \$71.56, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

26. Interest of $293, at 10% for 5 years.

$$\$293 \times .10 = \$29.30, \text{ int. for 1 yr.};$$
$$\$29.30 \times 5 = \$146.50, \text{ int. for 5 yr.}$$

27. Interest of $293, at 10% for 2 yr. 9 mo. = 33 mo.

$$\$293.10 = \$29.30, \text{ int. for 1 yr.}$$
$$\frac{\$29.30 \times 33}{12} = \$80.58, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

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28. Interest of \$293, at 10% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$\$293 \times .10 = \$29.30$, int. for 1 yr.;

$\dfrac{\$29.30 \times 19.7}{12} = \$48.10$, int. for $\dfrac{19.7}{12}$ yr.

29. Interest of \$293, at 10% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$\$293 \times .10 = \$29.30$, int. for 1 yr.;

$\dfrac{\$29.30 \times 11\frac{13}{30}}{12} = \$27.92$, int. for $\dfrac{11\frac{13}{30}}{12}$ yr.

30. Interest of \$293, at 10% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$\$293 \times .10 = \$29.30$, int. for 1 yr.;

$\dfrac{\$29.30 \times 36\frac{14}{15}}{12} = \$90.18$, int. for $\dfrac{36\frac{14}{15}}{12}$ yr.

31. Interest of \$293, at 7% for 5 years.

$\$293 \times .07 = \$20.51$, int. for 1 yr.;

$\$20.51 \times 5 = \$102.55$, int. for 5 yr.

32. Interest of \$293, at 7% for 2 yr. 9 mo. = 33 mo.

$\$293 \times .07 = \$20.51$, int. for 1 yr.;

$\dfrac{\$20.51 \times 33}{12} = \$56.40$, int. for $\frac{33}{12}$ yr.

33. Interest of \$293, at 7% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$\$293 \times .07 = \$20.51$, int. for 1 yr.;

$\dfrac{\$20.51 \times 19.7}{12} = \$33.67$, int. for $\dfrac{19.7}{12}$ yr.

34. Interest of \$293, at 7% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$\$293 \times .07 = \$20.51$, int. for 1 yr.;

$\dfrac{\$20.51 \times 11\frac{13}{30}}{12} = \$19.54$, int. for $\dfrac{11\frac{13}{30}}{12}$ yr.

35. Interest of \$293, at 7% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$\$293 \times .07 = \$20.51$, int. for 1 yr.;

$\dfrac{\$20.51 \times 36\frac{14}{15}}{12} = \$63.13$, int. for $\dfrac{36\frac{14}{15}}{12}$ yr.

36. Interest of \$293, at $4\frac{1}{2}$% for 5 years.

$\$293 \times .04\frac{1}{2} = \$13.185$, int. for 1 yr.;

$\$13.185 \times 5 = \$65.93$, int. for 5 yr.

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37. Interest of \$293, at $4\frac{1}{2}\%$ for 2 yr. 9 mo. = 33 mo.

$$\$293 \times .04\tfrac{1}{2} = \$13.185, \text{ int. for 1 yr.};$$

$$\frac{\$13.185 \times 33}{12} = \$36.26, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

38. Interest of \$293, at $4\frac{1}{2}\%$ for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$293 \times .04\tfrac{1}{2} = \$13.185, \text{ int. for 1 yr.};$$

$$\frac{\$13.185 \times 19.7}{12} = \$21.65, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

39. Interest of \$293, at $4\frac{1}{2}\%$ for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$293 \times .04\tfrac{1}{2} = \$13.185, \text{ int. for 1 yr.};$$

$$\frac{\$13.185 \times 11\frac{13}{30}}{12} = \$12.56, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

40. Interest of \$293, at $4\frac{1}{2}\%$ for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$293 \times .04\tfrac{1}{2} = \$13.185, \text{ int. for 1 yr.};$$

$$\frac{\$13.185 \times 36\frac{14}{15}}{12} = \$40.58, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

41. Interest of \$293, at 15% for 5 years.

$$\$293 \times .15 = \$43.95, \text{ int. for 1 yr.};$$

$$\$43.95 \times 5 = \$219.75, \text{ int. for 5 yr.}$$

42. Interest of \$293, at 15% for 2 yr. 9 mo. = 33 mo.

$$\$293 \times .15 = \$43.95, \text{ int. for 1 yr.};$$

$$\frac{\$43.95 \times 33}{12} = \$120.86, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

43. Interest of \$293, at 15% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$293 \times .15 = \$43.95, \text{ int. for 1 yr.};$$

$$\frac{\$43.95 \times 19.7}{12} = \$72.15, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

44. Interest of \$293, at 15% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$293 \times .15 = \$43.95, \text{ int. for 1 yr.};$$

$$\frac{\$43.95 \times 11\frac{13}{30}}{12} = \$41.87, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

45. Interest of \$293, at 15% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$293 \times .15 = \$43.95, \text{ int. for 1 yr.};$$

$$\frac{\$43.95 \times 36\frac{14}{15}}{12} = \$135.27, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

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46. Interest of $293, at 6% for 5 years.

$$\$293 \times .06 = \$17.58, \text{ int. for 1 yr.};$$
$$\$17.58 \times 5 = \$87.90, \text{ int. for 5 yr.}$$

47. Interest of $293, at 6% for 2 yr. 9 mo. = 33 mo.

$$\$293 \times .06 = \$17.58, \text{ int. for 1 yr.};$$
$$\frac{\$17.58 \times 33}{12} = \$48.35, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

48. Interest of $293, at 6% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$293 \times .06 = \$17.58, \text{ int. for 1 yr.};$$
$$\frac{\$17.58 \times 19.7}{12} = \$28.86, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

49. Interest of $293, at 6% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$293 \times .06 = \$17.58, \text{ int. for 1 yr.};$$
$$\frac{\$17.58 \times 11\frac{13}{30}}{12} = \$16.75, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

50. Interest of $293, at 6% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$293 \times .06 = \$17.58, \text{ int. for 1 yr.};$$
$$\frac{\$17.58 \times 36\frac{14}{15}}{12} = \$54.11, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

51. Interest of $7,461.13, at 10% for 5 years.

$$\$7,461.13 \times .10 = \$746.113, \text{ int. for 1 yr.};$$
$$\$746.113 \times 5 = \$3,730.57, \text{ int. for 5 yr.}$$

52. Interest of $7,461.13, at 10% for 2 yr. 9 mo. = 33 mo.

$$\$7,461.13 \times .10 = \$746.113, \text{ int. for 1 yr.};$$
$$\frac{\$746.113 \times 33}{12} = \$2,051.81, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

53. Interest of $7,461.13, at 10% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$7,461.13 \times .10 = \$746.113, \text{ int. for 1 yr.};$$
$$\frac{\$746.113 \times 19.7}{12} = \$1,224.87, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

54. Interest of $7,461.13, at 10% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$7,461.13 \times .10 = \$746.113, \text{ int. for 1 yr.};$$
$$\frac{\$746.113 \times 11\frac{13}{30}}{12} = \$710.88, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

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55. Interest of \$7,461.13, at 10% for 3 yr. 28 da. $= 36\frac{14}{15}$ mo.

$$\$7,461.13 \times .10 = \$746.113, \text{ int. for 1 yr.};$$

$$\frac{\$746.113 \times 36\frac{14}{15}}{12} = \$2,296.37, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

56. Interest of \$7,461.13, at 7% for 5 years.

$$\$7,461.13 \times .07 = \$522.28, \text{ int. for 1 yr.};$$

$$\$522.28 \times 5 = \$2,611.40, \text{ int. for 5 yr.}$$

57. Interest of \$7,461.13, at 7% for 2 yr. 9 mo. $= 33$ mo.

$$\$7,461.13 \times .07 = \$522.28, \text{ int. for 1 yr.};$$

$$\frac{\$522.28 \times 33}{12} = \$1,436.27, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

58. Interest of \$7,461.13, at 7% for 1 yr. 7 mo. 21 da. $= 19.7$ mo.

$$\$7,461.13 \times .07 = \$522.28, \text{ int. for 1 yr.};$$

$$\frac{\$522.28 \times 19.7}{12} = \$857.41, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

59. Interest of \$7,461.13, at 7% for 11 mo. 13 da. $= 11\frac{13}{30}$ mo.

$$\$7,461.13 \times .07 = \$522.28, \text{ int. for 1 yr.};$$

$$\frac{\$522.28 \times 11\frac{13}{30}}{12} = \$497.62, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

60. Interest of \$7,461.13, at 7% for 3 yr. 28 da. $= 36\frac{14}{15}$ mo.

$$\$7,461.13 \times .07 = \$522.28, \text{ int. for 1 yr.};$$

$$\frac{\$522.28 \times 36\frac{14}{15}}{12} = \$1,607.46, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

61. Interest of \$7,461.13, at $4\frac{1}{2}$% for 5 years.

$$\$7,461.13 \times .04\tfrac{1}{2} = \$335.75, \text{ int. for 1 yr.};$$

$$\$335.75 \times 5 = \$1,678.75, \text{ int. for 5 yr.}$$

62. Interest of \$7,461.13, at $4\frac{1}{2}$% for 2 yr. 9 mo. $= 33$ mo.

$$\$7,461.13 \times .04\tfrac{1}{2} = \$335.75, \text{ int. for 1 yr.};$$

$$\frac{\$335.75 \times 33}{12} = \$923.31, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

63. Interest of \$7,461.13, at $4\frac{1}{2}$% for 1 yr. 7 mo. 21 da. $= 19.7$ mo.

$$\$7,461.13 \times .04\tfrac{1}{2} = \$335.75, \text{ int. for 1 yr.};$$

$$\frac{\$335.75 \times 19.7}{12} = \$551.19, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

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64. Interest of \$7,461.13, at $4\frac{1}{2}\%$ for 11 mo. 13 da. $= 11\frac{13}{30}$ mo.

$$\$7,461.13 \times .04\tfrac{1}{2} = \$335.75, \text{ int. for 1 yr.};$$
$$\frac{\$335.75 \times 11\frac{13}{30}}{12} = \$319.90, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

65. Interest of \$7,461.13, at $4\frac{1}{2}\%$ for 3 yr. 28 da. $= 36\frac{14}{15}$ mo.

$$\$7,461.13 \times .04\tfrac{1}{2} = \$335.75, \text{ int. for 1 yr.};$$
$$\frac{\$335.75 \times 36\frac{14}{15}}{12} = \$1,033.3\dot{7}, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

66. Interest of \$7,461.13, at 15% for 5 years.

$$\$7,461.13 \times .15 = \$1,119.17, \text{ int. for 1 yr.};$$
$$\$1,119.17 \times 5 = \$5,595.85, \text{ int. for 5 yr.}$$

67. Interest of \$7,461.13, at 15% for 2 yr. 9 mo. = 33 mo.

$$\$7,461.13 \times .15 = \$1,119.17, \text{ int. for 1 yr.};$$
$$\frac{\$1,119.17 \times 33}{12} = \$3,077.72, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

68. Interest of \$7,461.13, at 15% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$7,461.13 \times .15 = \$1,119.17, \text{ int. for 1 yr.};$$
$$\frac{\$1,119.17 \times 19.7}{12} = \$1,837.30, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

69. Interest of \$7,461.13, at 15% for 11 mo. 13 da. $= 11\frac{13}{30}$ mo.

$$\$7,461.13 \times .15 = \$1,119.17, \text{ int. for 1 yr.};$$
$$\frac{\$1,119.17 \times 11\frac{13}{30}}{12} = \$1,066.32, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

70. Interest of \$7,461.13, at 15% for 3 yr. 28 da. $= 36\frac{14}{15}$ mo.

$$\$7,461.13 \times .15 = \$1,119.17, \text{ int. for 1 yr.};$$
$$\frac{\$1,119.17 \times 36\frac{14}{15}}{12} = \$3,444.56, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

71. Interest of \$7,461.13, at 6% for 5 years.

$$\$7,461.13 \times .06 = \$447.667, \text{ int. for 1 yr.};$$
$$\$447.667 \times 5 = \$2,238.34, \text{ int. for 5 yr.}$$

72. Interest of \$7,461.13, at 6% for 2 yr. 9 mo. = 33 mo.

$$\$7,461.13 \times .06 = \$447.667, \text{ int. for 1 yr.};$$
$$\frac{\$447.667 \times 33}{12} = \$1,231.09, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

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73. Interest of \$7,461.13, at 6% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$7{,}461.13 \times .06 = \$447.667, \text{ int. for 1 yr.};$$

$$\frac{\$447.667 \times 19.7}{12} = \$734.92, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

74. Interest of \$7,461.13, at 6% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$7{,}461.13 \times .06 = \$447.667, \text{ int. for 1 yr.};$$

$$\frac{\$447.667 \times 11\frac{13}{30}}{12} = \$426.53, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

75. Interest of \$7,461.13, at 6% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$7{,}461.13 \times .06 = \$447.667, \text{ int. for 1 yr.};$$

$$\frac{\$447.667 \times 36\frac{14}{15}}{12} = \$1{,}377.82, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

76. Interest of \$12,009.08, at 10% for 5 years.

$$\$12{,}009.08 \times .10 = \$1{,}200.908, \text{ int. for 1 yr.};$$

$$\$1{,}200.908 \times 5 = \$6{,}004.54, \text{ int. for 5 yr.}$$

77. Interest of \$12,009.08, at 10% for 2 yr. 9 mo. = 33 mo.

$$\$12{,}009.08 \times .10 = \$1{,}200.908, \text{ int. for 1 yr.};$$

$$\frac{\$1{,}200.908 \times 33}{12} = \$3{,}302.50, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

78. Interest of \$12,009.08, at 10% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$12{,}009.08 \times .10 = \$1{,}200.908, \text{ int. for 1 yr.};$$

$$\frac{\$1{,}200.908 \times 19.7}{12} = \$1{,}971.49, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

79. Interest of \$12,009.08, at 10% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$12{,}009.08 \times .10 = \$1{,}200.908, \text{ int. for 1 yr.};$$

$$\frac{\$1{,}200.908 \times 11\frac{13}{30}}{12} = \$1{,}144.20, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

80. Interest of \$12,009.08, at 10% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$12{,}009.08 \times .10 = \$1{,}200.908, \text{ int. for 1 yr.};$$

$$\frac{\$1{,}200.908 \times 36\frac{14}{15}}{12} = \$3{,}696.13, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

81. Interest of \$12,009.08, at 7% for 5 years.

$$\$12{,}009.08 \times .07 = \$840.635, \text{ int. for 1 yr.};$$

$$\$840.635 \times 5 = \$4{,}203.18, \text{ int. for 5 yr.}$$

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82. Interest of \$12,009.08, at 7% for 2 yr. 9 mo. = 33 mo.

$$\$12{,}009.08 \times .07 = \$840.635, \text{ int. for 1 yr.};$$

$$\frac{\$840.635 \times 33}{12} = \$2{,}311.75, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

83. Interest of \$12,009.08, at 7% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$12{,}009.08 \times .07 = \$840.635, \text{ int. for 1 yr.};$$

$$\frac{\$840.635 \times 19.7}{12} = \$1{,}380.04, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

84. Interest of \$12,009.08, at 7% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$12{,}009.08 \times .07 = \$840.635, \text{ int. for 1 yr.};$$

$$\frac{\$840.635 \times 11\frac{13}{30}}{12} = \$800.94, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

85. Interest of \$12,009.08, at 7% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$12{,}009.08 \times .07 = \$840.635, \text{ int. for 1 yr.};$$

$$\frac{\$840.635 \times 36\frac{14}{15}}{12} = \$2{,}587.29, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

86. Interest of \$12,009.08, at $4\frac{1}{2}$% for 5 years.

$$\$12{,}009.08 \times .04\tfrac{1}{2} = \$540.408, \text{ int. for 1 yr.};$$

$$\$540.408 \times 5 = \$2{,}702.04, \text{ int. for 5 yr.}$$

87. Interest of \$12,009.08, at $4\frac{1}{2}$% for 2 yr. 9 mo. = 33 mo.

$$\$12{,}009.08 \times .04\tfrac{1}{2} = \$540.408, \text{ int. for 1 yr.};$$

$$\frac{\$540.408 \times 33}{12} = \$1{,}486.12, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

88. Interest of \$12,009.08, at $4\frac{1}{2}$% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$12{,}009.08 \times .04\tfrac{1}{2} = \$540.408, \text{ int. for 1 yr.};$$

$$\frac{\$540.408 \times 19.7}{12} = \$887.17, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

89. Interest of \$12,009.08, at $4\frac{1}{2}$% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$12{,}009.08 \times .04\tfrac{1}{2} = \$540.408, \text{ int. for 1 yr.};$$

$$\frac{\$540.408 \times 11\frac{13}{30}}{12} = \$514.89, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

90. Interest of \$12,009.08, at $4\frac{1}{2}$% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$12{,}009.08 \times .04\tfrac{1}{2} = \$540.408, \text{ int. for 1 yr.};$$

$$\frac{\$540.408 \times 36\frac{14}{15}}{12} = \$1{,}663.26, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

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91. Interest of $12,009.08, at 15% for 5 years.

$\$12{,}009.08 \times .15 = \$1{,}801.362$, int. for 1 yr.;
$\$1{,}801.362 \times 5 = \$9{,}006.81$, int. for 5 yr.

92. Interest of $12,009.08, at 15% for 2 yr. 9 mo. = 33 mo.

$\$12{,}009.08 \times .15 = \$1{,}801.362$, int. for 1 yr.;
$\dfrac{\$1{,}801.362 \times 33}{12} = \$4{,}953.75$, int. for $\frac{33}{12}$ yr.

93. Interest of $12,009.08, at 15% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$\$12{,}009.08 \times .15 = \$1{,}801.362$, int. for 1 yr.;
$\dfrac{\$1{,}801.362 \times 19.7}{12} = \$2{,}957.24$, int. for $\dfrac{19.7}{12}$ yr.

94. Interest of $12,009.08, at 15% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$\$12{,}009.08 \times .15 = \$1{,}801.362$, int. for 1 yr.;
$\dfrac{\$1{,}801.362 \times 11\frac{13}{30}}{12} = \$1{,}716.30$, int. for $\dfrac{11\frac{13}{30}}{12}$ yr.

95. Interest of $12,009.08, at 15% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$\$12{,}009.08 \times .15 = \$1{,}801.362$, int. for 1 yr.;
$\dfrac{\$1{,}801.362 \times 36\frac{14}{15}}{12} = \$5{,}544.19$, int. for $\dfrac{36\frac{14}{15}}{12}$ yr.

96. Interest of $12,009.08, at 6% for 5 years.

$\$12{,}009.08 \times .06 = \$720.544$, int. for 1 yr.;
$\$720.544 \times 5 = \$3{,}602.72$, int. for 5 yr.

97. Interest of $12,009.08, at 6% for 2 yr. 9 mo. = 33 mo.

$\$12{,}009.08 \times .06 = \$720.544$, int. for 1 yr.;
$\dfrac{\$720.544 \times 33}{12} = \$1{,}981.50$, int. for $\frac{33}{12}$ yr.

98. Interest of $12,009.08, at 6% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$\$12{,}009.08 \times .06 = \$720.544$, int. for 1 yr.;
$\dfrac{\$720.544 \times 19.7}{12} = \$1{,}182.89$, int. for $\dfrac{19.7}{12}$ yr.

99. Interest of $12,009.08, at 6% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$\$12{,}009.08 \times .06 = \$720.544$, int. for 1 yr.;
$\dfrac{\$720.544 \times 11\frac{13}{30}}{12} = \$686.52$, int. for $\dfrac{11\frac{13}{30}}{12}$ yr.

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100. Interest of \$12,009.08, at 6% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$12{,}009.08 \times .06 = \$720.544, \text{ int. for 1 yr.};$$

$$\frac{\$720.544 \times 36\frac{14}{15}}{12} = \$2{,}217.68, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

101. Interest of \$4,731.87, at 10% for 5 years.

$$\$4{,}731.87 \times .10 = \$473.187, \text{ int. for 1 yr.};$$

$$\$473.187 \times 5 = \$2{,}365.94, \text{ int. for 5 yr.}$$

102. Interest of \$4,731.87, at 10% for 2 yr. 9 mo. = 33 mo.

$$\$4{,}731.87 \times .10 = \$473.187, \text{ int. for 1 yr.};$$

$$\frac{\$473.187 \times 33}{12} = \$1{,}301.26, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

103. Interest of \$4,731.87, at 10% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$4{,}731.87 \times .10 = \$473.187, \text{ int. for 1 yr.};$$

$$\frac{\$473.187 \times 19.7}{12} = \$776.82, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

104. Interest of \$4,731.87, at 10% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$$\$4{,}731.87 \times .10 = \$473.187, \text{ int. for 1 yr.};$$

$$\frac{\$473.187 \times 11\frac{13}{30}}{12} = \$450.84, \text{ int. for } \frac{11\frac{13}{30}}{12} \text{ yr.}$$

105. Interest of \$4,731.87, at 10% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$$\$4{,}731.87 \times .10 = \$473.187, \text{ int. for 1 yr.};$$

$$\frac{\$473.187 \times 36\frac{14}{15}}{12} = \$1{,}456.36, \text{ int. for } \frac{36\frac{14}{15}}{12} \text{ yr.}$$

106. Interest of \$4,731.87, at 7% for 5 years.

$$\$4{,}731.87 \times .07 = \$331.23, \text{ int. for 1 yr.};$$

$$\$331.23 \times 5 = \$1{,}656.15, \text{ int. for 5 yr.}$$

107. Interest of \$4,731.87, at 7% for 2 yr. 9 mo. = 33 mo.

$$\$4{,}731.87 \times .07 = \$331.23, \text{ int. for 1 yr.};$$

$$\frac{\$331.23 \times 33}{12} = \$910.88, \text{ int. for } \tfrac{33}{12} \text{ yr.}$$

108. Interest of \$4,731.87, at 7% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$$\$4{,}731.87 \times .07 = \$331.23, \text{ int. for 1 yr.};$$

$$\frac{\$331.23 \times 19.7}{12} = \$543.77, \text{ int. for } \frac{19.7}{12} \text{ yr.}$$

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109. Interest of \$4,731.87, at 7% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$\$4,731.87 \times .07 = \$331.23$, int. for 1 yr.;

$\frac{\$331.23 \times 11\frac{13}{30}}{12} = \$315.59$, int. for $\frac{11\frac{13}{30}}{12}$ yr.

110. Interest of \$4,731.87, at 7% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$\$4,731.87 \times ,07 = \$331.23$, int. for 1 yr.;

$\frac{\$331.23 \times 36\frac{14}{15}}{12} = \$1,019.46$, int. for $\frac{36\frac{14}{15}}{12}$ yr.

111. Interest of \$4,731.87, at $4\frac{1}{2}$% for 5 years.

$\$4,731.87 \times .04\frac{1}{2} = \$212.934$, int. for 1 yr.;

$\$212.934 \times 5 = \$1,064.67$, int. for 5 yr.

112. Interest of \$4,731.87, at $4\frac{1}{2}$% for 2 yr. 9 mo. = 33 mo.

$\$4,731.87 \times .04\frac{1}{2} = \$212.934$, int. for 1 yr.;

$\frac{\$212.934 \times 33}{12} = \$585.57$, int. for $\frac{33}{12}$ yr.

113. Interest of \$4,731.87, at $4\frac{1}{2}$% for 1 yr. 7 mo. 21 da. = 19.7 mo.

$\$4,731.87 \times .04\frac{1}{2} = \$212.934$, int. for 1 yr.;

$\frac{\$212.934 \times 19.7}{12} = \$349.57$, int. for $\frac{19.7}{12}$ yr.

114. Interest of \$4,731.87, at $4\frac{1}{2}$% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.

$\$4,731.87 \times .04\frac{1}{2} = \$212.934$, int. for 1 yr.;

$\frac{\$212.934 \times 11\frac{13}{30}}{12} = \$202.88$, int. for $\frac{11\frac{13}{30}}{12}$ yr.

115. Interest of \$4,731.87, at $4\frac{1}{2}$% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.

$\$4,731.87 \times .04\frac{1}{2} = \$212.934$, int. for 1 yr.:

$\frac{\$212.934 \times 36\frac{14}{15}}{12} = \$655.36$, int. for $\frac{36\frac{14}{15}}{12}$ yr.

116. Interest of \$4,731.87, at 15% for 5 years.

$\$4,731.87 \times .15 = \$709.78$, int. for 1 yr.;

$\$709.78 \times 5 = \$3,548.90$, int. for 5 yr.

117. Interest of \$4,731.87, at 15% for 2 yr. 9 mo. = 33 mo.

$\$4,731.87 \times .15 = \$709.78$, int. for 1 yr.;

$\frac{\$709.78 \times 33}{12} = \$1,951,90$, int. for $\frac{33}{12}$ yr.

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118. Interest of \$4,731.87, at 15% for 1 yr. 7 mo. 21 da. = 19.7 mo.
$\$4,731.87 \times .15 = \$709.78$, int. for 1 yr.;
$\frac{\$709.78 \times 19.7}{12} = \$1,165.22$, int. for $\frac{19.7}{12}$ yr.

119. Interest of \$4,731.87, at 15% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.
$\$4,731.87 \times .15 = \$709.78$, int. for 1 yr.;
$\frac{\$709.78 \times 11\frac{13}{30}}{12} = \$676.26$, int. for $\frac{11\frac{13}{30}}{12}$ yr.

120. Interest of \$4,731.87, at 15% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.
$\$4,731.87 \times .15 = \$709.78$, int. for 1 yr.;
$\frac{\$709.78 \times 36\frac{14}{15}}{12} = \$2,184.55$, int. for $\frac{36\frac{14}{15}}{12}$ yr.

121. Interest of \$4,731.87, at 6% for 5 years.
$\$4,731.87 \times .06 = \$283.912$, int. for 1 yr.;
$\$283.912 \times 5 = \$1,419.56$, int. for 5 yr.

122. Interest of \$4,731.87, at 6% for 2 yr. 9 mo. = 33 mo.
$\$4,731.87 \times .06 = \$283.912$, int. for 1 yr.;
$\frac{\$283.912 \times 33}{12} = \$780.76$, int. for $\frac{33}{12}$ yr.

123. Interest of \$4,731.87, at 6% for 1 yr. 7 mo. 21 da. = 19.7 mo.
$\$4,731.87 \times .06 = \$283.912$, int. for 1 yr.;
$\frac{\$283.912 \times 19.7}{12} = \$466.09$, int. for $\frac{19.7}{12}$ yr.

124. Interest of \$4,731.87, at 6% for 11 mo. 13 da. = $11\frac{13}{30}$ mo.
$\$4,731.87 \times .06 = \$283.912$, int. for 1 yr.;
$\frac{\$283.912 \times 11\frac{13}{30}}{12} = \$270.51$, int. for $\frac{11\frac{13}{30}}{12}$ yr.

125. Interest of \$4,731.87, at 6% for 3 yr. 28 da. = $36\frac{14}{15}$ mo.
$\$4,731.87 \times .06 = \$283.912$, int. for 1 yr.;
$\frac{\$283.912 \times 36\frac{14}{15}}{12} = \$873.82$, int. for $\frac{36\frac{14}{15}}{12}$ yr.

126. Amount of \$82.44, at $5\frac{1}{4}$% for 7 mo. 10 da. = $7\frac{1}{3}$ mo.
$\$82.44 \times .05\frac{1}{4} = \$4.328$, int. for 1 yr.;
$\frac{\$4.328 \times 7\frac{1}{3}}{12} = \$\ 2.64$, int. for $\frac{7\frac{1}{3}}{12}$ yr.
82.44, prin.
\$85.08, amt.

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127. Amount of $82.44, at 5¼% for 2 yr. 11 mo. = 35 mo.

$\$82.44 \times .05\frac{1}{4} = \$4.328$, int. for 1 yr.;

$\frac{\$4.328 \times 35}{12} = \$12.62$, int. for $\frac{35}{12}$ yr.

82.44, prin.

$95.06, amt.

128. Amount of $82.44, at 5¼% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$\$82.44 \times .05\frac{1}{4} = \$4.328$, int. for 1 yr.;

$\frac{\$4.328 \times 15.9}{12} = \$\ 5.73$, int. for $\frac{15.9}{12}$ yr.

82.44, prin.

$88.17, amt.

129. Amount of $82.44, at 7% for 7 mo. 10 da. = 7⅓ mo.

$\$82.44 \times .07 = \$5.77$, int. for 1 yr.;

$\frac{\$5.77 \times 7\frac{1}{3}}{12} = \$\ 3.53$, int. for $\frac{7\frac{1}{3}}{12}$ yr.

82.44, prin.

$85.97, amt.

130. Amount of $82.44, at 7% for 2 yr. 11 mo. = 35 mo.

$\$82.44 \times .07 = \$5.77$, int. for 1 yr.;

$\frac{\$5.77 \times 35}{12} = \$16.83$, int. for $\frac{35}{12}$ yr.

82.44, prin.

$99.27, amt.

131. Amount of $82.44, at 7% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$\$82.44 \times .07 = \$5.77$, int. for 1 yr.;

$\frac{\$5.77 \times 15.9}{12} = \$\ 7.65$, int. for $\frac{15.9}{12}$ yr.

82.44, prin.

$90.09, amt.

132. Amount of $82.44, at 6% for 7 mo. 10 da. = 7⅓ mo.

$\$82.44 \times .06 = \$4.946$, int. for 1 yr.;

$\frac{\$4.946 \times 7\frac{1}{3}}{12} = \$\ 3.02$, int. for $\frac{7\frac{1}{3}}{12}$ yr.

82.44, prin.

$85.46, amt.

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133. Amount of \$82.44, at 6% for 2 yr. 11 mo. = 35 mo.

$$\$82.44 \times .06 = \$4.946, \text{ int. for 1 yr.;}$$

$$\frac{\$4.946 \times 35}{12} = \$14.43, \text{ int. for } \tfrac{35}{12} \text{ yr.}$$

$$\begin{array}{r} 82.44, \text{ prin.} \\ \hline \$96.87, \text{ amt.} \end{array}$$

134. Amount of \$82.44, at 6% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$$\$82.44 \times .06 = \$4.946, \text{ int. for 1 yr.;}$$

$$\frac{\$4.946 \times 15.9}{12} = \$\ 6.55, \text{ int. for } \frac{15.9}{12} \text{ yr.}$$

$$\begin{array}{r} 82.44, \text{ prin.} \\ \hline \$88.99, \text{ amt.} \end{array}$$

135. Amount of \$316.90, at $5\frac{1}{4}$% for 7 mo. 10 da. = $7\frac{1}{3}$ mo.

$$\$316.90 \times .05\tfrac{1}{4} = \$16.637, \text{ int. for 1 yr.;}$$

$$\frac{\$16.637 \times 7\frac{1}{3}}{12} = \$\ 10.17, \text{ int. for } \frac{7\frac{1}{3}}{12} \text{ yr.}$$

$$\begin{array}{r} 316.90, \text{ prin.} \\ \hline \$327.07, \text{ amt.} \end{array}$$

136. Amount of \$316.90, at $5\frac{1}{4}$% for 2 yr. 11 mo. = 35 mo.

$$\$316.90 \times .05\tfrac{1}{4} = \$16.637, \text{ int. for 1 yr.;}$$

$$\frac{\$16.637 \times 35}{12} = \$\ 48.52, \text{ int. for } \tfrac{35}{12} \text{ yr.}$$

$$\begin{array}{r} 316.90, \text{ prin.} \\ \hline \$365.42, \text{ amt.} \end{array}$$

137. Amount of \$316.90, at $5\frac{1}{4}$% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$$\$316.90 \times .05\tfrac{1}{4} = \$16.637, \text{ int. for 1 yr.;}$$

$$\frac{\$16.637 \times 15.9}{12} = \$\ 22.04, \text{ int. for } \frac{15.9}{12} \text{ yr.}$$

$$\begin{array}{r} 316.90, \text{ prin.} \\ \hline \$338.94, \text{ amt.} \end{array}$$

138. Amount of \$316.90, at 7% for 7 mo. 10 da. = $7\frac{1}{3}$ mo.

$$\$316.90 \times .07 = \$22.183, \text{ int. for 1 yr.;}$$

$$\frac{\$22.183 \times 7\frac{1}{3}}{12} = \$\ 13.56, \text{ int. for } \frac{7\frac{1}{3}}{12} \text{ yr.}$$

$$\begin{array}{r} 316.90, \text{ prin.} \\ \hline \$330.46, \text{ amt.} \end{array}$$

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139. Amount of \$316.90, at 7% for 2 yr. 11 mo. = 35 mo.

$$\begin{aligned} \$316.90 \times .07 &= \$22.183, \text{ int. for 1 yr.;}\\ \frac{\$22.183 \times 35}{12} &= \$\ \ 64.70, \text{ int. for } \tfrac{35}{12} \text{ yr.}\\ &\ \ \ \underline{316.90}, \text{ prin.}\\ &\ \$381.60, \text{ amt.}\end{aligned}$$

140. Amount of \$316.90, at 7% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$$\begin{aligned} \$316.90 \times .07 &= \$22.183, \text{ int. for 1 yr.;}\\ \frac{\$22.183 \times 15.9}{12} &= \$\ \ 29.39, \text{ int. for } \frac{15.9}{12} \text{ yr.}\\ &\ \ \ \underline{316.90}, \text{ prin.}\\ &\ \$346.29, \text{ amt.}\end{aligned}$$

141. Amount of \$316.90, at 6% for 7 mo. 10 da. = 7⅓ mo.

$$\begin{aligned} \$316.90 \times .06 &= \$19.014, \text{ int. for 1 yr.;}\\ \frac{\$19.014 \times 7\frac{1}{3}}{12} &= \$\ \ 11.62, \text{ int. for } \frac{7\frac{1}{3}}{12} \text{ yr.}\\ &\ \ \ \underline{316.90}, \text{ prin.}\\ &\ \$328.52, \text{ amt.}\end{aligned}$$

142. Amount of \$316.90, at 6% for 2 yr. 11 mo. = 35 mo.

$$\begin{aligned} \$316.90 \times .06 &= \$19.014, \text{ int. for 1 yr.;}\\ \frac{\$19.014 \times 35}{12} &= \$\ \ 55.46, \text{ int. for } \tfrac{35}{12} \text{ yr.}\\ &\ \ \ \underline{316.90}, \text{ prin.}\\ &\ \$372.36, \text{ amt.}\end{aligned}$$

143. Amount of \$316.90, at 6% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$$\begin{aligned} \$316.90 \times .06 &= \$19.014, \text{ int. for 1 yr.;}\\ \frac{\$19.014 \times 15.9}{12} &= \$\ \ 25.19, \text{ int. for } \frac{15.9}{12} \text{ yr.}\\ &\ \ \ \underline{316.90}, \text{ prin.}\\ &\ \$342.09, \text{ amt.}\end{aligned}$$

144. Amount of \$2.054, at 5½% for 7 mo. 10 da. = 7⅓ mo.

$$\begin{aligned} \$2.054 \times .05\tfrac{1}{2} &= \$\ .11, \text{ int. for 1 yr.;}\\ \frac{\$.11 \times 7\frac{1}{3}}{12} &= \$\ \ .07, \text{ int. for } \frac{7\frac{1}{3}}{12} \text{ yr.}\\ &\ \ \ \underline{2.05}, \text{ prin.}\\ &\ \$2.12, \text{ amt.}\end{aligned}$$

Page 263.

145. Amount of \$2.054, at 5¼% for 2 yr. 11 mo. = 35 mo.

$$\$2.054 \times .05\tfrac{1}{4} = \$\,.11, \text{ int. for 1 yr.;}$$

$$\frac{\$\,.11 \times 35}{12} = \$\ \ .32, \text{ int. for } \tfrac{35}{12} \text{ yr.}$$

$$\begin{array}{l} \underline{\ \ 2.05,} \text{ prin.} \\ \$2.37, \text{ amt.} \end{array}$$

146. Amount of \$2.054, at 5¼% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$$\$2.054 \times .05\tfrac{1}{4} = \$\,.11, \text{ int. for 1 yr.;}$$

$$\frac{\$\,.11 \times 15.9}{12} = \$\ \ .15, \text{ int. for } \frac{15.9}{12} \text{ yr.}$$

$$\begin{array}{l} \underline{\ \ 2.05,} \text{ prin.} \\ \$2.20, \text{ amt.} \end{array}$$

147. Amount of \$2.054, at 7% for 7 mo. 10 da. = 7⅓ mo.

$$\$2.054 \times .07 = \$\,.143, \text{ int. for 1 yr.;}$$

$$\frac{\$\,.143 \times 7\tfrac{1}{3}}{12} = \$\ \ .09, \text{ int. for } \frac{7\tfrac{1}{3}}{12} \text{ yr.}$$

$$\begin{array}{l} \underline{\ \ 2.05,} \text{ prin.} \\ \$2.14, \text{ amt.} \end{array}$$

148. Amount of \$2.054, at 7% for 2 yr. 11 mo. = 35 mo.

$$\$2.054 \times .07 = \$\,.143, \text{ int. for 1 yr.;}$$

$$\frac{\$\,.143 \times 35}{12} = \$\ \ .42, \text{ int. for } \tfrac{35}{12} \text{ yr.}$$

$$\begin{array}{l} \underline{\ \ 2.05,} \text{ prin.} \\ \$2.47, \text{ amt.} \end{array}$$

149. Amount of \$2.054, at 7% for 1 yr. 3 mo. 27 da. = 15.9 mo.

$$\$2.054 \times .07 = \$\,.143, \text{ int. for 1 yr.;}$$

$$\frac{\$\,.143 \times 15.9}{12} = \$\ \ .19, \text{ int. for } \frac{15.9}{12} \text{ yr.}$$

$$\begin{array}{l} \underline{\ \ 2.05,} \text{ prin.} \\ \$2.24, \text{ amt.} \end{array}$$

150. Amount of \$2.054, at 7% for 7 mo. 10 da. = 7⅓ mo.

$$\$2.054 \times .06 = \$\,.123, \text{ int. for 1 yr.;}$$

$$\frac{\$\,.123 \times 7\tfrac{1}{3}}{12} = \$\ \ .08, \text{ int. for } \frac{7\tfrac{1}{3}}{12} \text{ yr.}$$

$$\begin{array}{l} \underline{\ \ 2.05,} \text{ prin.} \\ \$2.13, \text{ amt.} \end{array}$$

Page 263.

151. Amount of \$2.054, at 6% for 2 yr. 11 mo. = 35 mo.

\$2.054 × .06 = \$ .123, int. for 1 yr.;

$\frac{\$.123 \times 35}{12} = \$\ .36$, int. for $\frac{35}{12}$ yr.

2.05, prin.

\$2.41, amt.

152. Amount of \$2.054, at 6% for 1 yr. 3 mo. 27 da. = 15.9 mo.

\$2.054 × .06 = \$ .123, int. for 1 yr.;

$\frac{\$.123 \times 15.9}{12} = \$\ .163$, int. for $\frac{15.9}{12}$ yr.

2.054, prin.

\$2.22, amt.

153. Time, 7 mo. 15 da. = 7.5 mo.

\$13,080 × .08 = \$1,046.40, int. for 1 yr.;

$\frac{\$1{,}046.40 \times 7.5}{12} = \$654$, int. for $\frac{7.5}{12}$ yr.

154. Time, 2 yr. 2 mo. 20 da. = 26⅔ mo.

\$180 × .06 = \$10.80, int. for 1 yr.;

$\frac{\$10.80 \times 26\frac{2}{3}}{12} = \$\ 24$, int. for $\frac{26\frac{2}{3}}{12}$ yr.

180, prin.

\$204, amt.

155. Time, 2 yr. 5 mo. 10 da. = 29⅓ mo.

\$100 × .09 = \$9, int. for 1 yr.;

$\frac{\$9 \times 29\frac{1}{3}}{12} = \$22$, int. for $\frac{29\frac{1}{3}}{12}$ yr.

156. Time, 4 yr. 4 mo. 15 da. = 52.5 mo.

\$375 × .08 = \$30, int. for 1 yr.;

$\frac{\$30 \times 52.5}{12} = \$131.25$, int. for $\frac{52.5}{12}$ yr.

157. Time, 1 yr. 8 mo. = 20 mo.

\$873.60 × .10 = \$87.36, int. for 1 yr.

$\frac{\$87.36 \times 20}{12} = \$145.60$, int. for $\frac{20}{12}$ yr.

Page 263.

158. Time, 1 yr. 2 mo. 15 da. = 14.5 mo.

$\$1,824.75 \times .06 = \$109.485$, int. for 1 yr.;

$\frac{\$109.485 \times 14.5}{12} = \$\ \ 132.29$, int. for $\frac{14.5}{12}$ yr.

$\underline{\ \ 1,824.75}$, prin.

$\$1,957.04$, amt.

159. Time, 4 mo. 16 da. = $4\frac{8}{15}$ mo.

$\$213.50 \times .07 = \$14.945$, int. for 1 yr.;

$\frac{\$14.945 \times 4\frac{8}{15}}{12} = \$\ \ 5.65$, int. for $\frac{4\frac{8}{15}}{12}$ yr.

$\underline{\ \ 213.50}$, prin.

$\$219.15$, amt.

160. $\$237.50 \times .02\frac{1}{2} = \$5.94$, discount.

Page 264.

161. See Forms of Notes, Second Book in Arithmetic, page 160.

162. Time, 8 mo. 6 da. = 8.2 mo.

$\$956 \times .06 = \$57.36$, int. for 1 yr.;

$\frac{\$57.36 \times 8.2}{12} = \$39.20$, int. for $\frac{8.2}{12}$ yr.

163. The result can not be obtained without the time from Jan. 1, 1882, to to-day.

164. Time, 1 yr. 1 mo. 15 da. = 13.5 mo.

$\$1,000 \times .08 = \$80$, int. for 1 yr.;

$\frac{\$80 \times 13.5}{12} = \$\ \ \ 90$, int. for $\frac{13.5}{12}$ yr.

$\underline{\ \ 1,000}$, prin.

$\$1,090$, amt.

135. $1,090, amt. due Apr. 17, 1882.

$1,090, amt.,—$350, payt., = $740, amt. still due.

Time, 1 yr. 2 mo. 9 da. = 14.3 mo.

$\$740 \times .08 = \$59.20$, int. for 1 yr.;

$\frac{\$59.20 \times 14.3}{12} = \$\ 70.55$, int. for $\frac{14.3}{12}$ yr.

$\underline{\ \ 740,\ \ }$ prin.

$810.55, amt. due June 26, 1883.

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166. Time to 1st payment, 6 mo. 15 da. = 6.5 mo.;
" " settlement, 8 mo. 7 da. = $8\frac{7}{30}$ mo.
$1,824 × .06 = $109.44, int. for 1 yr.;
$\frac{\$109.44 \times 6.5}{12} = \$\ 59.28$, int. for $\frac{6.5}{12}$ yr.
1,824 , prin.
$1,883.28, amt.
550 , payt.
$1,333.28, amt. or new principal Apr. 25, 1882.
$1,333.28 × .06 = $79.996, int. for 1 yr.;
$\frac{\$79.996 \times 8\frac{7}{30}}{12} = \$\ 54.89$, int. for $\frac{8\frac{7}{30}}{12}$ yr.
1,333.28, prin.
$1,388.17, amt. due Jan. 2, 1883.

167. Time to 1st payment, 1 yr. 6 mo. 28 da. = $18\frac{14}{15}$ mo.
" " 2d " 4 mo. 7 da. = $4\frac{7}{30}$ mo.
" " settlement, 4 mo. 9 da. = 4.3 mo.
$1,650 × .06 = $99, int. for 1 yr.;
$\frac{\$99 \times 18\frac{14}{15}}{12} = \$\ 156.20$, int. for $\frac{18\frac{14}{15}}{12}$ yr.
1,650 , prin.
$1,806.20, amt.
225 , payt.
$1,581.20, amt. or new principal June 17, 1882.
$1,581.20 × .06 = $94.872, int. for 1 yr.;
$\frac{\$94.872 \times 4\frac{7}{30}}{12} = \$\ 33.47$, int. for $\frac{4\frac{7}{30}}{12}$ yr.
1,581.20, prin.
$1,614.67, amt.
475 , payt.
$1,139.67, amt. or new principal Oct. 24, 1882.
$1,139.67 × .06 = $68.38, int. for 1 yr.;
$\frac{\$68.38 \times 4.3}{12} = \$\ 24.50$, int. for $\frac{4.3}{12}$ yr.
1,139.67, prin.
$1,164.17, amt. due on settlement.

168. 100% – 5% = 95% = .95
$3,126.50 × .95 = $2,970.18, received for the goods.

169. 1 – .25 = .75; $920 × .75 = $690,
1 – .03 = .97; $690 × .97 = $669.30, cash cost.

GENERAL REVIEW PROBLEMS.

Page 265.

1

$1 + .87\frac{1}{2} = 1.87\frac{1}{2}$; and
$11{,}480 \text{ votes} \times 1.87\frac{1}{2} = 21{,}525 \text{ votes.}$

2

81 A. to the 1st.
76.5 " " " 2d.
157.5 "
225
67.5 " " " 3d.

$81 \text{ A.} \div 225 = .36 \text{ A.} = 36\%$;
$76.5 \text{ A.} \div 225 = .34 \text{ A.} = 34\%$; and
$67.5 \text{ A.} \div 225 = .30 \text{ A.} = 30\%.$

3

$33\% - 25\frac{1}{2}\% = 7\frac{1}{2}\%$;
$480 \text{ mi.} \times .07\frac{1}{2} = 36 \text{ mi.}$

4

$1 + .33\frac{1}{3} = 1.33\frac{1}{3}$;
$\$.45 \div 1.33\frac{1}{3} = \$.33\frac{3}{4}$

5

$\$24 \div (1 + .20 =)\ 1.20 = \$20$, cost of 1st.
$\$24 \div (1 - .20 =)\ .80 = \underline{\$30}$, " " 2d.
$\$50$, " " both.
$\$24 + \$24 = \underline{\$48}$, rec'd for both.
$\$\ 2$, loss.

6

$\$7.20 \div (1 - .10 =)\ .90 = \$8$, cost per M.
$\$9\ (= 10 \times \$.90) - \$8 = \$1$, gain per M.
$\$1 \div 8 = \$.12\frac{1}{2} = 12\frac{1}{2}\%$ gain.

7

$\$.75 \times (1 + .20 =)\ 1.20 = \$.90$, per lb.

8

$\$157.75$, percentage $\div\ .02\frac{1}{2}$, rate, $= \$6{,}310$

9

$\$950$, collection.
$\$950 \times .12\frac{1}{2} = \underline{\$118.75}$, fees.
$\$831.25$, remittance.

10 ***Page 265.***

$\$387.75 + (\frac{7}{8} \text{ of } 1\% =)\ .00875 = \$44,314.29$

11

$\$935 \div 34,750 = \$\ .02\frac{96}{139} = 2\frac{96}{139}\%$, rate of taxation;
$\$9,475 \times .02\frac{96}{139} = \$254.94$, A's tax.

12 ***Page 266.***

$\$7,850 \times (\frac{3}{4}\% =)\ .00\frac{3}{4} = \$\ 58.87\frac{1}{2}$, premium on store;
$\$12,375 \times (\frac{1}{2}\% =)\ .00\frac{1}{2} = \$\ 61.87\frac{1}{2}$, " " goods;
$\$120.75$, total premium.

13

$\$1,968.75 + 87,500 = \$\ .02\frac{1}{4} = 2\frac{1}{4}\%$

14

$\$2,500 \times (1 - .08\frac{1}{2} =)\ .91\frac{1}{2} = \$2,287.50$

15

$5 \times \$118 = \$590$, value of stock.

16

Time, 2 yr. 6 mo. = 30 mo.
$\$45.50 \times .06 = \$2.73$, int. for 1 yr.;
$\frac{\$2.73 \times 30}{12} = \$6.83$, int. for $\frac{30}{12}$ yr.

17

Time, 2 yr. 3 mo. 6 da. = 27.2 mo.
$\$735 \times .06 = \$44.10$, int. for 1 yr.;
$\frac{\$44.10 \times 27.2}{12} = \$99.96$, int. for $\frac{27.2}{12}$ yr.

18

Time, 1 yr. 10 mo. 18 da. = 22.6 mo.
$\$385.50 \times .07 = \$26.985$, int. for 1 yr.;
$\frac{\$26.985 \times 22.6}{12} = \$\ 50.82$, int. for $\frac{22.6}{12}$ yr.
385.50, prin.
$436.32, amt.

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19

The sum saved each year is $150.

The sum saved the first year is at interest 9 years, that saved the second year is at interest 8 years, that saved the third year is at interest 7 years, and so on; hence, the total interest is the interest of $150 for

9 yr. + 8 yr. + 7 yr. + 6 yr. + 5 yr. + 4 yr. + 3 yr. + 2 yr. + 1 yr. = 45 yr.

The total savings are 10 × $150 = $1,500
" " interest is $150 × .10 × 45 = 675
Amount, $2,175

20

100% − 25% = 75% = .75, left after spending 25%.
.75 − (25% of .75 =) .18¾ = .56¼, still remaining.
$675 ÷ .56¼ = $1,200, my original capital.

21

$\$1.25 \div (1 - .28\frac{4}{7} =)\ .71\frac{3}{7} = \$1.75$, manufacturer's price.
$1.75 × (1 + .22 =) 1.22 = $2.13½, retail price.

22

2,240 lb. − 2,000 lb. = 240 lb., percentage;
240 lb., percentage ÷ 2,000, base, = .12 lb. = 12% profit.

23

$ .005, percentage, + .25 = $ .02, base, = cost of each egg;
$ .02 × (1 + .25 =) 1.25 = $ .025, selling-price " "
$ .025 × 12 = $ .30, " per dozen.

24

$147.—, premium, ÷ .01½ = $9,800 insured on 1st store;
97.50 " ÷ .01½ = $6,500 " " 2d "
153.75 " ÷ .01½ = $10,250 " " 3d "
107.25 " ÷ .01½ = $7,150 " " 4th "

Page 267.

25

$1,000 + (1 + .02 =) 1.02 = $9,803.92 left after deducting commission;
$9,803.92 = 9,803.92 bu. of wheat at $1 per bu.;
9,803.92 bu. ÷ 1.06¼ = 922.722 + bu. of wheat.

26

Page 267.

$2,500 × (1 + .06 =) 1.06 = $2,650

27

5% discount on $100, par value, = $ 95, cost per share;
8% premium " $100, " " = $103, selling-price per share.
The difference, $ 8, gain on 1 share.
$184 = 184 shares at a gain of $1 per share;
184 shares ÷ 8 = 23 shares, at a gain of $8 per share;
23 × $95, cost of 1 share, = $2,185 invested.

28

Time, 3 yr. 9 mo. = 45 mo.
$4,850 × .06 = $291, int. for 1 yr.;
$\frac{\$291 \times 45}{12}$ = $1,091.25, int. for $\frac{45}{12}$ yr.
4,850 , prin.
$5,941.25, amt.

29

Time, 1 yr. 11 mo. 4 da. = $23\frac{2}{15}$ mo.
$754.19 × .06 = $45.25, int. for 1 yr.;
$\frac{\$45.25 \times 23\frac{2}{15}}{12}$ = $ 87.23, int. for $\frac{23\frac{2}{15}}{12}$ yr.
754.19, prin.
$841.42, amt.

30

The result depends upon the legal rate of interest in this State.

31

$\frac{3}{8}$ × (40% =) $\frac{2}{5}$ = $\frac{3}{20}$ of the ship sold;
$\frac{3}{8} - \frac{3}{20} = \frac{9}{40}$ of the ship he still owned.

32

$50 ÷ .20 = $250, cost of the wheat.
$250 = 250 bu. at $1 per bu.
250 bu. ÷ 1.25 = 200 bu.

Page 267. **33**

Goods that cost $1 sell at retail for $1 + $ .30 = $1.30;
And at wholesale for $1.30 × (1 − .12 =) .88 = 1.14⅖.
$1.14⅖, wholesale price, − $1, cost, = $ .14⅖ = 14⅖% gain.

34

33 yr. − 27 yr. = 6 yr. $8,000 = 8 times $1,000
8 × $ 21.70 = $ 173.60, premium for 1 yr.
6 × 173.60 = 1,041.60, " " 6 "
$8,000 − $1,041.60 = $6,958.40, net receipts.

35

375 × 100 × $ .17⅛ = $6,421.87½, cost of coffee.
$80.27 ÷ 6,421.875 = $ .01¼, nearly, = 1¼%.

Page 268. **36**

$2,500 × (1 + .03 =) 1.03 = $2,575, amt. at end of 6 mo.
$2,575 − $1,600 = $975, due after the payment.
$975 × (1 + .03 =) 1.03 = $1,004.25, due at end of year.

37

1 − .27 = .73, or $73 paid per share.
1 − .12 = .88, or $88 received per share.
$88 − $73 = $15, gained per share.
45 × $15 = $675, gain.

38

Goods worth $1 are bought for $ .33⅓,
and are sold for 1.10
The profits are $1.10 − $ .33⅓ = $ .76⅔
i. e., Goods that cost $ .33⅓ sell at a profit of $ .76⅔,
$ .76⅔ ÷ .33⅓ = $2.30 = 230% gain.

39

100%, cost, − 25%, loss = 75% = .75, remained after leakage;
1.20 (= 1 + .20) × .75 = .90 of total cost rec'd for what remained;
1, cost − .90, receipts = .10 = 10%, loss.

40 ***Page 268.***

Time to 1st payment, 7 mo. 8 da. = $7\frac{4}{15}$ mo.
" " 2d " 8 " 10 " = $8\frac{1}{3}$ "
" " settlement, 8 " 26 " = $8\frac{13}{15}$ "

\$850 × .06 = \$51, int. for 1 yr.;
$\frac{\$51 \times 7\frac{4}{15}}{12}$ = \$ 30.88, int. for $\frac{7\frac{4}{15}}{12}$ yr.
850 , prin.
\$880.88, amt.
290 , payt.
\$590.88, new prin. Apr. 23, 1881.

\$590.88 × .06 = \$35.45, int. for 1 yr.;
$\frac{\$35.45 \times 8\frac{1}{3}}{12}$ = \$ 24.62, int. for $\frac{8\frac{1}{3}}{12}$ yr.
590.88, prin.
\$615.50, amt.
345 , payt.
\$270.50, new prin. Jan. 3, 1882.

\$270.50 × .06 = \$16.23, int. for 1 yr.
$\frac{\$16.23 \times 8\frac{13}{15}}{12}$ = \$ 11.99, int. for $\frac{8\frac{13}{15}}{12}$ yr.
270.50, prin.
\$282.49, amt. due at settlement.

41. 1, selling-price, − .66⅔, cost, = .33⅓, gain.
.33⅓, percentage, ÷ .66⅔, cost, = .50 = 50%, gain.

42. 97 × \$70 = \$6,790, value of farm.
\$6,790 × .06 = \$407.40, yearly interest.
\$500 − \$407.40 = \$92.60, cheaper to buy.

43. 80 × \$4.20 = \$336, cost of sheep.
\$336 × .035 = \$ 11.76, int. for 6 mo.
336 , prin.
\$347.76, amt. due at end of 6 mo.
80 × \$5.25 = \$420 , sum received for sheep;
\$72.24, received for keeping the sheep.

44. 1 lb. of uncleansed wool weighs .55 of a pound after cleansing.
.55 lb. cost \$ .60; 1 lb. cost \$ .60 ÷ .55 = \$$1\frac{1}{11}$.
\$$1\frac{1}{11}$ × 1.33⅓ = \$$1.45\frac{5}{11}$.

SUPPLEMENT.

SHORT METHODS OF COMPUTATION.

Page 281.

1

72 = 8 × 9
4,285 × 8 = 34,280
34,280 × 9 = 308,520

2

108 = 9 × 12
42,196 × 9 = 379,764
379,764 × 12 = 4,557,168

3

252 = 6 × 6 × 7
805,061 × 6 = 4,830,366
4,830,366 × 6 = 28,982,196
28,982,196 × 7 = 202,875,372

4

21 = 3 × 7
878 × 3 = 2,634
2,634 × 7 = 18,438

5

99 = 9 × 11
878 × 9 = 7,902
7,902 × 11 = 86,922

6

42 = 6 × 7
30.54 × 6 = 183.24
183.24 × 7 = 1,282.68

7

5.6 = .7 × 8
500.05 × .7 = 350.035
350.035 × 8 = 2,800.28

8

.032 = .04 × .8
.00964 × .04 = .0003856
.0003856 × .8 = .00030848

Page 282; Article 16.

1. $3\frac{1}{3} = \frac{1}{3}$ of 10; $\frac{582 \times 10}{3} = 1,940$

2. $25 = \frac{1}{4}$ of 100; $\frac{1,735 \times 100}{4} = 43,375$

3. $500 = \frac{1}{2}$ of 1,000; $\frac{491 \times 1,000}{2} = 245,500$

4. $1\frac{1}{4} = \frac{1}{8}$ of 10; $\frac{364 \times 10}{8} = 455$

5. $2,500 = \frac{1}{4}$ of 10,000; $\frac{2.015 \times 10,000}{4} = 5,037.5$

Page 282; Article 16.

6. $16\frac{2}{3} = \frac{1}{6}$ of 100; $\frac{7.14 \times 100}{6} = 119$

7. $12\frac{1}{2} = \frac{1}{8}$ of 100; $\frac{\$3.25 \times 100}{8} = \$40.625$

8. $83\frac{1}{3} = \frac{1}{12}$ of 1,000; $\frac{\$75 \times 1{,}000}{12} = \$6{,}250$

9. $\$3.33\frac{1}{3} = \frac{1}{3}$ of \$10; $\frac{\$10 \times 198}{3} = \$660$

10. $\$\,.01\frac{1}{4} = \frac{1}{8}$ of \$ .10; $\frac{144 \times \$\,.10}{8} = \$1.80$

11. $\$\,.75 = \$\frac{3}{4} = 3 \times \frac{1}{4};\ 625 \times \$\frac{1}{4} \times 3 = \$468.75$

12. $\$1.12\frac{1}{2} = \$\frac{9}{8} = \$1 + \$\frac{1}{8};\ \$376 + \$\frac{376}{8} = \$423$

Article 17.

1

7,496 × 99 = 749,600 − 7,496 = 742,104

2

6,842 × 999 = 6,842,000 − 6,842 = 6,835,158

3

16,971 × 9,999 = 169,710,000 − 16,971 = 169,693,029

4

80,207 × 99,999 = 8,020,700,000 − 80,207 = 8,020,619,793

5

227,641 × 999,999 = 227,641,000,000 − 227,641 = 227,640,772,359

6

26,942,781 × 99,999 = 2,694,278,100,000 − 26,942,781 =
2,694,251,157,219

Page 283; Article 18.

1

56 = 7 × 8

7) 40,600
8) 5,800
725

2

35 = 5 × 7

5) 2,310
7) 462
66

3

48 = 6 × 8

6) 179,412
8) 29,902
3,737$\frac{3}{4}$

4

5.4 = 6 × .9

6) 27,030
.9) 4,505.0
5005$\frac{5}{9}$

5

168 = 4 × 6 × 7

4) 1,720.32
6) 430.08
7) 71.68
10.24

6

1.25 = .5 × .5 × 5

.5) 100.625
.5) 201.25
5) 402.5
80.5

7

2,520 = 4 × 7 × 9 × 10

4) 87,444
7) 21,861
9) 3,123
10) 347
34$\frac{7}{10}$

Article 19.

1. $2\frac{1}{2} = \frac{1}{4}$ of 10; $\frac{4,280}{10} \times 4 = 1,712$

2. $500 = \frac{1}{2}$ of 1,000; $\frac{13,450}{1,000} \times 2 = 26.9$

3. $333\frac{1}{3} = \frac{1}{3}$ of 1,000; $\frac{66,000}{1,000} \times 3 = 198$

4. $16\frac{2}{3} = \frac{1}{6}$ of 100; $\frac{119}{100} \times 6 = 7.14$

5. $12\frac{1}{2} = \frac{1}{8}$ of 100; $\frac{\$478.50}{100} \times 8 = \$38.28$

6. $\$\,.20 = \frac{1}{5}$ of \$1; $\frac{35.48}{1.00} \times 5 = 177.4$

7. $25 = \frac{1}{4}$ of 100; $\frac{\$56.75}{100} \times 4 = \$2.27$

8. $12\frac{1}{2} = \frac{1}{8}$ of 100; $\frac{\$1.40875}{100} \times 8 = \$\,.1127$

9. $250 = \frac{1}{4}$ of 1,000; $\frac{\$8.125}{1,000} \times 4 = \$65$

Page 283; Article 19.

10. $\$1.25 = \frac{1}{8}$ of $\$10$; $\frac{4.25}{10}$ yd. × 8 = 3.4 yd.

11. $\$.20 = \frac{1}{5}$ of $\$1$; 13.1875 lb. × 5 = 65.9375 lb. = 65 lb. 15 oz.

12. $\$16.66\frac{2}{3} = \frac{1}{6}$ of $\$100$; $\frac{9,641}{100}$ bar. × 6 = 578.46 bar.

CONVERSE REDUCTIONS.

Page 284.

1

$.375 = \frac{375}{1000} = \frac{3}{8}$

2

$.9125 = \frac{9125}{10000} = \frac{73}{80}$

3

$.85 = \frac{85}{100} = \frac{17}{20}$

4

$.1625 = \frac{1625}{10000} = \frac{13}{80}$

5

$.00064 = \frac{64}{100000} = \frac{2}{3125}$

6

$.06875 = \frac{6875}{100000} = \frac{11}{160}$

7

$18.75 = 18\frac{75}{100} = 18\frac{3}{4}$

8

$.00016$ mi. $= \frac{16}{100000}$ mi. $= \frac{1}{6250}$ mi.

9

$.02\frac{3}{4}$ wk. $= .0275$ wk. $= \frac{275}{10000}$ wk. $= \frac{11}{400}$ wk.

10

$$\$.16\frac{2}{3} = \frac{\$16\frac{2}{3}}{100} = \frac{\$50}{300} = \$\frac{1}{6}$$

Page 285.

1

$\frac{7}{20} = 7 \div 20$

20) 7.0

.35

2

$\frac{13}{32} = 13 \div 32$

32) 13.00000

.40625

3

$\frac{3}{11} = 3 \div 11$

11) 3.0000

.2727 +

4

$\frac{1}{25000} = 1 \div 25000$

25000) 1.00000

.00004

5

$\frac{3}{4} = 3 \div 4 = .75$; $18\frac{3}{4} = 18.75$

$\frac{3}{40} = 3 \div 40 = .075$; $7\frac{3}{40} = 7.075$

6

$\frac{5}{9}$ da. = 5 da. ÷ 9

9) 5.000 da.

.555 + da.

7

$\frac{4}{11}$ yd. = 4 yd. ÷ 11

11) 4.0000 yd.

.3636 + yd.

Hence, $19\frac{4}{11}$ yd. = 19.3636 + yd.

Page 286.

1. .8 da. = 19.2 h.; .2 h. = 12 min.
Hence, .8 da. = 19 h. 12 min.

2. .625 yd. = 1.875 ft.; .875 ft. = 10.5 in.
Hence, .625 yd. = 1 ft. 10½ in.

3. .21875 mi. = 70 rd.

4. .875 bu. = 3.5 pk.; .5 pk. = 4 qt.
Hence, 21.875 bu. = 21 bu. 3 pk. 4 qt.

5

.66⅔ gal. = 2.66⅔ qt.; .66⅔ qt. = 1.33⅓ pt.; .33⅓ pt. = 1⅓ gi.
Hence, .66⅔ gal. = 2 qt. 1 pt. 1⅓ gi.

6

.0019$\frac{5}{9}$ sq. yd. = .0176 sq. ft. = 2.5344 sq. in.

7

.75 yr. of 365 da. = 273.75 da.; .75 da. = 18 h.
Hence, .75 yr. = 273 da. 18 h.

8

⅔ gro. T. = 13.33⅓ cwt.; .33⅓ cwt. = 1.33⅓ qr.; .33⅓ qr. = 9⅓ l
Hence, ⅔ gro. T. = 13 cwt. 1 qr. 9⅓ lb.

Article 24.

1

2 | 1.00 pt.
8 | 5.5000 qt.
4 | 3.687500 pk.
.921875 bu.

Hence, 3 pk. 5 qt. 1 pt.
= .921875 bu.

2

2 | 1.25 pt.
4 | 3.625 qt.
.90625 gal.

Hence, 3 qt. 1¼ pt. = .90625 gal.

3

12 | 6 units
12 | 7.5 doz.
.625 gro.

Hence, 7 doz. 6 units = .625 gr

4

12 | 8 in.
3 | 1.66⅔ ft.
5.5 | 4.55$\frac{5}{9}$ yd.
.8282 + rd.

Hence, 4 yd. 1 ft. 8 in. = .8282 + r

Page 286; Article 24.

5

24 | 6 sheets
20 | 13.25 quires
.6625 rm.

Hence, 13 quires 6 sheets
= .6625 rm.

6

16 | 8 oz.
100 | 203.5 lb.
20 | 2.035 cwt.
.10175 T.

Hence, 203 lb. 8 oz. = .10175 T.

7

60 | 24 sec.
60 | 50.4 min.
24 | 15.84 h.
.66 da.

Hence, 15 h. 50 min. 24 sec.
= .66 da.

8

12 | 3 in.
3 | 2.25 ft.
5.5 | 2.75 yd.
.5 rd.

Hence, 2 yd. 2 ft. 3 in. = .5 rd.

Page 287; Article 25.

1

$\frac{8}{15}$ × 12 doz. = $6\frac{6}{15}$ doz.
$\frac{6}{15}$ × 12 units = $4\frac{4}{5}$ units
Hence, $\frac{8}{15}$ gro. = 6 doz. $4\frac{4}{5}$ units

2

$\frac{2}{3}$ × 640 A. = $426\frac{2}{3}$ A.
$\frac{2}{3}$ × 160 sq. rd. = $106\frac{2}{3}$ sq. rd.
$\frac{2}{3}$ × $30\frac{1}{4}$ sq. yd. = $20\frac{1}{6}$ sq. yd.
$\frac{1}{6}$ × 9 sq. ft. = $1\frac{1}{2}$ sq. ft.
$\frac{1}{2}$ × 144 sq. in. = 72 sq. in.
Hence, $\frac{2}{3}$ sq. mi. = 426 A. 106 sq. rd. 20 sq. yd. 1 sq. ft. 72 sq. in.

3

$\frac{11}{12}$ × 160 sq. rd. = $146\frac{2}{3}$ sq. rd.
$\frac{2}{3}$ × $30\frac{1}{4}$ sq. yd. = $20\frac{1}{6}$ sq. yd.
$\frac{1}{6}$ × 9 sq. ft. = $1\frac{1}{2}$ sq. ft.
$\frac{1}{2}$ × 144 sq. in. = 72 sq. in.
Hence, $\frac{11}{12}$ A. = 146 sq. rd. 20 sq. yd. 1 sq. ft. 72 sq. in.

4

$\frac{33}{64}$ × 4 pk. = $2\frac{1}{16}$ pk.
$\frac{1}{16}$ × 8 qt. = $\frac{1}{2}$ qt.
$\frac{8}{16}$ × 2 pt. = 1 pt.
Hence, $1\frac{33}{64}$ bu. = 1 bu. 2 pk. 1 pt.

5

$\frac{1922}{2016}$ × 63 gal. = $60\frac{126}{2016}$ gal.
$\frac{126}{2016}$ × 4 qt. = $\frac{504}{2016}$ qt.
$\frac{504}{2016}$ × 2 pt. = $\frac{1008}{2016}$ pt.
$\frac{1008}{2016}$ × 4 gi. = 2 gi.
Hence, $\frac{1922}{2016}$ hhd. = 60 gal. 2 gi.

6

$\frac{3}{5}$ × 366 da. = $219\frac{3}{5}$ da.
$\frac{3}{5}$ × 24 h. = $14\frac{2}{5}$ h.
$\frac{2}{5}$ × 60 min. = 24 min.
Hence, $\frac{3}{5}$ of a leap-year
= 219 da. 14 h. 24 min.

Page 287; Article 26. 1

2 qt. 1 pt. 3 gi. = 23 gi.; 1 gal. = 32 gi.; 23 gi. = $\frac{23}{32}$ gal.
Hence, 2 qt. 1 pt. 3 gi. = $\frac{23}{32}$ gal.

2

24 sq. ft. 18 sq. in. = 3,474 sq. in.; 1 sq. rd. = 39,204 sq. in.;
3,474 sq. in. = $\frac{3474}{39204}$ sq. rd. = $\frac{193}{2178}$ sq. rd.
Hence, 24 sq. ft. 18 sq. in. = $\frac{193}{2178}$ sq. rd.

3

130 rd. 2 yd. 1 ft. 3 in. = 25,827 in.; 1 mi. = 63,360 in.;
25,827 in. = $\frac{25827}{63360}$ mi. = $\frac{8609}{21120}$ mi.
Hence, 130 rd. 2 yd. 1 ft. 3 in. = $\frac{8609}{21120}$ mi.

4

3 pk. 1 pt. = 49 pt.; 1 bu. = 64 pt.; 49 pt. = $\frac{49}{64}$ bu.
Hence, 3 pk. 1 pt. = $\frac{49}{64}$ bu.

5

24 cu. ft. 1,080 cu. in. = 42,552 cu. in.; 1 cu. yd. = 46,656 cu. in.;
42,552 cu. in. = $\frac{42552}{46656}$ cu. yd. = $\frac{197}{216}$ cu. yd.
Hence, 24 cu. ft. 1,080 cu. in. = $\frac{197}{216}$ cu. yd.

6

8 h. 10 min. 21 sec. = 29,421 sec.; 1 da. = 86,400 sec.;
29,421 sec. = $\frac{29421}{86400}$ da. = $\frac{9807}{28800}$ da.
Hence, 8 h. 10 min. 21 sec. = $\frac{9807}{28800}$ da.

PRICE, QUANTITY, AND COST.

Page 289.

1

429 × \$7.06¼ = \$3,029.81¼

2

91.88 × \$112.50 = \$10,336.50

3

$\frac{7}{8}$ × \$1.75 = \$1.53⅛

4

3,145 = 31.45 C
31.45 × \$2.85 = \$89.63

Page 289.

5

1,155 = 11.55 C
11.55 × $14.50 = $167.47½

6

15,690 = 15.69 M
15.69 × $18.75 = $294.18¾

7

85,432 = 85.432 M
85.432 × $7.50 = $640.74

8

2,784 lb. = 1.392 T.
1.392 × $13 = $18.096

9. 4,680 lb. = 2.34 T.; 2.34 × $27.50 = $64.35

Page 290.

1

At $1 per bar. $3,029.81¼ will buy 3,029.81¼ bar.
3,029.81¼ bar. ÷ 7.06¼ = 429 bar.

2

$10,336.50=10,336.50 T. at $1 per T.
10,336.50 T. ÷ 56.25 = 183.76 T.

3

2\frac{13}{16}$=2$\frac{13}{16}$ yd. at $1 per yd.
2$\frac{13}{16}$ yd. ÷ ⅝ = 4½ yd.

4

$68.78¼ = 68.78¼ C at $1 per C
68.78¼ C ÷ 2.25 = 30.57 C = 3,057 pickets.

5

$44.275 = 44.275 cwt. at $1 per cwt.
44.275 cwt. ÷ 11.50 = 3.85 cwt. = 385 lb.

6

$640.74 = 640.74 M at $1 per M
640.74 M ÷ 7.50 = 85.432 M = 85,432 bricks.

7

$294.18¾ = 294.18¾ M at $1 per M
294.18¾ M ÷ 18.75 = 15.69 M = 15,690 ft.

8

$18.096 = 18.096 T. at $1 per T.
18.096 T. ÷ 13 = 1.392 T. = 2,784 lb.

9

$64.35 = 64.35 T. at $1 per T.
64.35 T. ÷ 27.50 = 2.34 T. = 4,680 lb.

Page 291; Article 34.

1

$\$3,029\frac{13}{16} \div 429 = \$7.06\frac{1}{4}$

2

$\$10,336.50 \div 183.76 = \$56.25$

3

$\$2.81\frac{1}{4} \div \frac{5}{8} = \$4.50$

4

$3,057 = 30.57$ C
$\$68.78\frac{1}{4} \div 30.57 = \$2.25$

5

$385 = 3.85$ C
$\$44.275 \div 3.85 = \$11.50$

6

$85,432 = 85.432$ M
$\$640.74 \div 85.432 = \$7.50$

7

$15,690 = 15.69$ M
$\$294\frac{3}{16} \div 15.69 = \$18.75$

8

2,784 lb. = 1.392 T.
$\$18.096 \div 1.392 = \$13$

9

4,680 lb. = 2.34 T.
$\$64.35 \div 2.34 = \$27.50$

Article 35.

1

3 lb. 8 oz. = 3.5 lb.
$3.5 \times \$4.75 = \$16.625$

2

$\$16.62\frac{1}{2} = 16.62\frac{1}{2}$ lb. at \$1 per lb.
$16.62\frac{1}{2}$ lb. ÷ 4.75 = 3.5 lb. = 3 lb. 8 oz.

3

$\$16.625 \div 3\frac{1}{2} = \$4.75$

4

$755 = 7.55$ C
$7.55 \times \$1.12\frac{1}{2} = \$8.49\frac{3}{8}$

5

$\$2.81\frac{3}{4} = 2.81\frac{3}{4}$ bar. at \$1 per bar.
$2.81\frac{3}{4}$ bar. ÷ 4.5 = $.62\frac{11}{18}$ bar. = 26 gal. 1 + qt.

6

$13,450 = 13.45$ M
$13.45 \times \$6.50 = \$87.425$

7

$\$5.62\frac{1}{2} = 5.62\frac{1}{2}$ cd. at \$1 per cd.
$5.62\frac{1}{2}$ cd. ÷ 7.5 = .75 cd. = $\frac{3}{4}$ cd.

8

3,575 lb. = 1.7875 T. of 2,000 lb.
$1.7875 \times \$6.50 = \$11.61\frac{7}{8}$

Page 292.

9

$\$61.68\frac{3}{4} \div 27\frac{5}{12} = \$2.25$

10

$12,826 = 128.26$ C
$\$237.82 \div 128.26 = \$1.85$

11

5,040 lb. = 2.52 T.
$2.52 \times \$16.50 = \$41.58$

12

\$250 = 250 M ft. at \$1 per M
250 M ft. ÷ 2.50 = 100 M ft.

13

$\frac{\$60.50}{968} \times 2{,}000 = \$125$

15

$258 = 258 M ft. at $1 per M ft.
258 M ft. ÷ 24 = $10\frac{3}{4}$ M ft.

Page 292.

14

$59\frac{1}{2} \times \$\,.93\frac{3}{4} = \$55.78\frac{1}{8}$

17

47 bu. 1 pk. 2 qt. = $47\frac{5}{16}$ bu.
$47\frac{5}{16} \times \$3.25 = \$153.77$

16

$111.56¼ = 111.56¼ T. at $1 per T.
$111.56\frac{1}{4}$ T. ÷ $28.33\frac{1}{3}$ = 3.9375 T. = 3 T. 1,875 lb.

18

$1\frac{3}{4}$ rd. = $28\frac{7}{8}$ ft.
54 T. $281\frac{1}{4}$ lb. = 108,281.25 lb.
$6 \times 10 \times 28\frac{7}{8}$ cu. ft. = 1,732.5 cu. ft.
108,281.25 lb. ÷ 1,732.5 = $62\frac{1}{2}$ lb.

19

Time, 24 weeks.
24 × 3 × 35 lb. = 2,520 lb. = 25.2 C lb.
$8.10 ÷ 25.2 = $ $.32\frac{1}{7}$ per C.

20

1,952 lb. = .976 T.
$256.20 ÷ .976 = $262.50

21

$258.75 = 258.75 M ft. at $1 per M ft.
258.75 M ft. ÷ 45 = 5.75 M ft. = 5,750 ft.

22

$12 \times 36 \times \$\,.16\frac{2}{3} = \$72$

23

$97\frac{1}{2} \times \$\,.09\frac{1}{4} = \$9.02$

24

3,219 lb.
3,074 "
3,621 "
3,342 "
2,990 "
16,246 "

Coal and wagon weighed	16,246 lb.
Wagon weighed 5 × 964 lb. =	4,820 "
Coal weighed	11,426 "

11,426 lb. = 5.713 T.
5.713 × $5.75 = $32.85

25

1,276.5 lb. of copper from 2,240 lb. of ore is 1 lb. of copper from $\frac{2240}{1276.5}$ lb. of ore, and 857.8 lb. of copper from $857.8 \times \frac{2240}{1276.5}$ lb. of ore = 13 cwt. 1 qr. $21\frac{679}{2553}$ lb.

LONGITUDE AND TIME.

Page 301; Article 66.

1

32 min.
15
8°

2

54 sec.
15
13′ 30″

3

5 min. 20 sec.
15
1° 20′

4

28 min. 45 sec.
15
7° 11′ 15″

5

1 h. 8 min. 30 sec.
15
17° 7′ 30″

6

8 h. 12 min. 27 sec.
15
123° 6′ 45″

7

13 min. 20 sec.
15
3° 20′ W.

8

1 h. 10 min.
15
17° 30′ E.

9

6 h. 40 min. 12 sec.
15
100° 3′ W.

10

2 h.
15
30° E.

11

24 min. 52 sec.
15
6° 13′ W.

12

9 h. 9 min. 9 sec.
15
137° 17′ 15″ E.

Article 67.

1

77° 0′ 15″ W.
2° 20′ E.
15) 79° 20′ 15″
Difference, 5 h. 17 min. 21 sec.

2

75° 10′ W.
12° 27′ E.
15) 87° 37′
Diff., 5 h. 50 min. 28 sec.

3

90° 2′ 30″ W.
5′ 38″ W.
15) 89° 56′ 52″
Diff., 5 h. 59 min. $47\frac{7}{15}$ sec.

4

90° 15′ 15″ W.
113° 14′ E.
203° 29′ 15″
360°
15) 156° 30′ 45″
Diff., 10 h. 26 min. 3 sec.

5

84° 39′ 21″ W.
13° 23′ 45″ E.
15) 98° 3′ 6″
Diff., 6 h. 32 min. $12\frac{2}{5}$ sec.

6

Washington, 77° 0′ 15″ W.
Greenwich, 0°
15) 77° 0′ 15″
Diff., 5 h. 8 min. 1 sec.

7

N. Y., 74° 3′ W.
Boston, 71° 3′ 30″ W.
15) 2° 59′ 30″
11 min. 58 sec. P.M.

8

San Fr., 122° 26′ 45″ W.
N. Y., 74° 3′ W.
15) 48° 23′ 45″
Diff., 3 h. 13 min. 35 sec.
12 “
8 h. 46 min. 25 sec. A.M.

9

Chicago, 87° 37′ 45″ W.
Boston, 71° 3′ 30″ W.
15) 16° 34′ 15″
1 h. 6 min. 17 sec. P.M.

10

San Fr., 122° 26′ 45″ W.
Chicago, 87° 37′ 45″ W.
15) 34° 49′
Diff., 2 h. 19 min. 16 sec.
12 “
9 h. 40 min. 44 sec. A.M.

Page 301.

11

N. Y., 74° 3′ W.
Boston, 71° 3′ 30″ W.
15) 2° 59′ 30″
Diff., 11 min. 58 sec.
7 h. 30 “
7 h. 41 min. 58 sec. A.M.

12

San Fr., 122° 26′ 45″ W.
N. Y., 74° 3′ W.
15) 48° 23′ 45″
Diff., 3 h. 13 min. 35 sec.
7 “ 30 “
4 h. 16 min. 25 sec. A.M.

13

Chicago, 87° 37′ 45″ W.
Boston, 71° 3′ 30″ W.
15) 16° 34′ 15″
Diff., 1 h. 6 min. 17 sec.
7 “ 30 “
8 h. 36 min. 17 sec. A.M.

14

San Fr., 122° 26′ 45″ W.
Chicago, 87° 37′ 45″ W.
15) 34° 49′
Diff., 2 h. 19 min. 16 sec.
7 “ 30 “
5 h. 10 min. 44 sec. A.M.

INTEREST.

Page 307; Article 87.

1

6 mo. = 6% at 1% a month;
$6\% \div 2 = 3\%$

2

9 mo. = 9% at 1% a month;
$9\% \div 2 = 4\frac{1}{2}\%$

3

8 mo. 12 da. = $8\frac{2}{5}$ mo. = $8\frac{2}{5}\%$ at 1% a month;
$8\frac{2}{5}\% \div 2 = 4\frac{1}{5}\%$

4

5 mo. 18 da. = $5\frac{3}{5}$ mo. = $5\frac{3}{5}\%$ at 1% a month;
$5\frac{3}{5}\% \div 2 = 2\frac{4}{5}\%$

5

1 yr. 6 mo. = 18 mo. = 18% at 1% a month;
$18\% \div 2 = 9\%$

6

3 yr. 1 mo. 15 da. = 37.5 mo. = 37.5% at 1% a month;
$37.5\% \div 2 = 18\frac{3}{4}\%$

7

2 yr. 29 da. = $24\frac{29}{30}$ mo. = $24\frac{29}{30}\%$ at 1% a month; $24\frac{29}{30}\% \div 2 = 12\frac{59}{60}\%$

8. Interest of $250 for 4 mo. 9 da.
4 mo. 9 da. = 4.3 mo. = 2.15% = .0215
$\$250 \times .0215 = \$5.37\frac{1}{2}$

9. Interest of $250 for 5 yr. $7\frac{1}{2}$ mo.
5 yr. $7\frac{1}{2}$ mo. = 67.5 mo. = 33.75% = .3375
$\$250 \times .3375 = \$84.37\frac{1}{2}$

10. Interest of $250 for 4 yr. 20 da.
4 yr. 20 da. = $48\frac{2}{3}$ mo. = $24\frac{1}{3}\%$ = $.24\frac{1}{3}$
$\$250 \times .24\frac{1}{3} = \$60.83$

11. Interest of $250 for 2 yr. 11 mo. 11 da.
2 yr. 11 mo. 11 da. = $35\frac{11}{30}$ mo. = $17\frac{41}{60}\%$ = $.17\frac{41}{60}$
$\$250 \times .17\frac{41}{60} = \$44.21$

Page 307.

12. Interest of $1,913.50 for 4 mo. 9 da.
4 mo. 9 da. = 4.3 mo. = 2.15% = .0215
$1,913.50 × .0215 = $41.14

13. Interest of $1,913.50 for 5 yr. 7$\frac{1}{2}$ mo.
5 yr. 7$\frac{1}{2}$ mo. = 67.5 mo. = 33.75% = .3375
$1,913.50 × .3375 = $645.81

14. Interest of $1,913.50 for 4 yr. 20 da.
4 yr. 20 da. = 48$\frac{2}{3}$ mo. = 24$\frac{1}{3}$% = .24$\frac{1}{3}$
$1,913.50 × .24$\frac{1}{3}$ = $465.62

15. Interest of $1,913.50 for 2 yr. 11 mo. 11 da.
2 yr. 11 mo. 11 da. = 33$\frac{11}{30}$ mo. = 17$\frac{41}{60}$% = .17$\frac{41}{60}$
$1,913.50 × .17$\frac{41}{60}$ = $338.37

16. Interest of $629.37 for 4 mo. 9 da.
4 mo. 9 da. = 4.3 mo. = 2.15% = .0215
$629.37 × .0215 = $13.53

17. Interest of $629.37 for 5 yr. 7$\frac{1}{2}$ mo.
5 yr. 7$\frac{1}{2}$ mo. = 67.5 mo. = 33.75% = .3375
$629.37 × .3375 = $212.41

18. Interest of $629.37 for 4 yr. 20 da.
4 yr. 20 da. = 48$\frac{2}{3}$ mo. = 24$\frac{1}{3}$% = .24$\frac{1}{3}$
$629.37 × .24$\frac{1}{3}$ = $153.15

19. Interest of $629.37 for 2 yr. 11 mo. 11 da.
2 yr. 11 mo. 11 da. = 35$\frac{11}{30}$ mo. = 17$\frac{41}{60}$% = .17$\frac{41}{60}$
$629.37 × .17$\frac{41}{60}$ = $111.29

20. Interest of $12,078 for 4 mo. 9 da.
4 mo. 9 da. = 4.3 mo. = 2.15% = .0215
$12,078 × .0215 = $259.68

21. Interest of $12,078 for 5 yr. 7$\frac{1}{2}$ mo.
5 yr. 7$\frac{1}{2}$ mo. = 67$\frac{1}{2}$ mo. = 33.75% = .3375
$12,078 × .3375 = $4,076.33

22. Interest of $12,078 for 4 yr. 20 da.
4 yr. 20 da. = 48$\frac{2}{3}$ mo. = 24$\frac{1}{3}$% = .24$\frac{1}{3}$
$12,078 × .24$\frac{1}{3}$ = $2,938.98

23. Interest of $12,078 for 2 yr. 11 mo. 11 da.
2 yr. 11 mo. 11 da. = 35$\frac{11}{30}$ mo. = 17$\frac{41}{60}$% = 17$\frac{41}{60}$
$12,078 × .17$\frac{41}{60}$ = $2,135.79

Page 307; Article 88.

1

$\frac{20}{6000} \times \$753 = \$2.51$

2

$\frac{75}{6000} \times \$18{,}720 = \$234$

3

$\frac{33}{6000} \times \$2{,}869.25 = \$15.78$

4

$\frac{12}{6000} \times \$158.81\frac{1}{4} = \$\,.32$

5

$\frac{3}{6000} \times \$10{,}000 = \$5$

6

$\frac{18}{6000} \times \$500 = \$1.50$

7

$\frac{93}{6000} \times \$21{,}315 = \$330.38$

8

$\frac{1}{6000} \times \$50{,}000 = \$8.33$

Page 308.

9

Time, 2 mo. 11 da. = 71 da.
$\frac{71}{6000} \times \$240 = \$2.84$

10

6 mo. 15 da. = 195 da.
$\frac{195}{6000} \times \$476 = \$15.47$

11

Time, 3 mo. 3 da. = 93 da.
$\frac{93}{6000} \times \$853.25 = \$13.23$

12

8 mo. 10 da. = 250 da.
$\frac{250}{6000} \times \$2{,}681.35 = \$111.72$

13

$\frac{90}{6000} \times \$350.75 = \$5.26$

14

3 mo. 9 da. = 99 da.
$\frac{99}{6000} \times \$12{,}097 = \$199.60$

15

8 mo. 12 da. = 252 da.
$\frac{252}{6000} \times \$972 = \$40.82$

16

4 mo. 21 da. = 141 da.
$\frac{141}{6000} \times \$2{,}345.50 = \$55.12$

Page 309.

1

Time, 30 mo. = .125, per cent;
$50.75, int., ÷ .125 = $406, prin.

2

Time, 33.2 mo. = $.22\frac{2}{15}$, per cent;
$1,748.50, int., ÷ $.22\frac{2}{15}$ = $7.899.85, prin.

3

Time, $6\frac{1}{3}$ mo. = $.03\frac{1}{6}$, per cent;
$300, int., ÷ $.03\frac{1}{6}$ = $9,473.68, prin.

4

365 × $ .05 = $18.25, int.;
$18.25, int., ÷ .07 = $260.71, prin.

5

Time, 28.4 mo. = .142, per cent;
$313, int., ÷ .142 = $2,204.23, prin.

6

Time, 42 mo. = .14, per cent;
$5.11, int., ÷ .14 = $36.50, prin.

Page 310; Art. 94.

1

Time, 6 mo. = .035, per cent;
1 + .035 = 1.035, amt. of 1;
\$500.55 ÷ 1.035 = \$483.62, prin.

2

Time, 16 mo. = .08, per cent;
1 + .08 = 1.08, amt. of 1;
\$356 ÷ 1.08 = \$329.63, prin.

3

Time, 2 yr. = .16, per cent;
1 + .16 = 1.16, amt. of 1;
\$720.60 ÷ 1.16 = \$621.21, prin.

4

Time, 10 yr. = 1.00, per cent;
1 + 1.00 = 2.00, amt. of 1;
\$135 ÷ 2 = \$67.50, prin.

5

Time, $12\frac{5}{6}$ mo. = $.04\frac{5}{18}$, per cent;
1 + $.04\frac{5}{18}$ = $1.04\frac{5}{18}$, amt. of 1;
\$1,660.10 ÷ $1.04\frac{5}{18}$ = \$1,592, prin.

6

Time, 23.6 mo. = $.098\frac{1}{3}$, per cent;
1 + $.098\frac{1}{3}$ = $1.098\frac{1}{3}$, amt. of 1;
\$461.12 ÷ $1.098\frac{1}{3}$ = \$419.84, prin.

Article 95.

1

4 yr. 5 mo. 26 da. = $4\frac{22}{45}$ yr. = $.04\frac{22}{45}$, per cent at 1%;
\$36.50 × $.04\frac{22}{45}$ = $\$1.6384\frac{4}{9}$, int. at 1%;
\$7.373 ÷ $1.6384\frac{4}{9}$ = \$ $.04\frac{1}{2}$ = $4\frac{1}{2}$%

2

3 yr. 5 mo. 12 da. = 3.45 yr. = .0345, per cent at 1%;
\$278 × .0345 = \$9.591, int. at 1%;
\$47.955 ÷ 9.591 = \$ .05 = 5%

3

1 yr. 4 mo. = $1\frac{1}{3}$ yr. = $.01\frac{1}{3}$, per cent at 1%;
\$311.50 × $.01\frac{1}{3}$ = $\$4.15\frac{1}{3}$, int. at 1%;
\$24.92 ÷ $4.15\frac{1}{3}$ = \$ .06 = 6%

4

3 yr. 7 mo. 9 da. = $3.6\frac{1}{12}$ yr. = $.036\frac{1}{12}$, per cent at 1%;
\$57.92 × $.036\frac{1}{12}$ = \$2.09, int. at 1%;
\$12.54 ÷ 2.09 = \$ .06 = 6%

5

2 yr. 20 da. = $2\frac{1}{18}$ yr. = $.02\frac{1}{18}$, per cent at 1%;
\$273.51 × $.02\frac{1}{18}$ = \$5.62, int. at 1%;
\$50.60 ÷ 5.62 = \$ .09 = 9%

6

5 yr. 4 mo. = $5\frac{1}{3}$ yr. = $.05\frac{1}{3}$, per cent at 1%;
\$1,950 × $.05\frac{1}{3}$ = \$104, int. at 1%;
\$364 ÷ 104 = \$ $.03\frac{1}{2}$ = $3\frac{1}{2}$%

Page 311; Article 96.

1

$125 × .06 = $7.50

$\frac{13.29}{7.50}$ yr. = $1\frac{193}{250}$ yr. = 1 yr. 9 mo. 8 da.

2

$150 × .05 = $7.50

$\frac{18.75}{7.50}$ yr. = $2\frac{1}{2}$ yr. = 2 yr. 6 mo.

3

$100 × .04½ = $4.50

$\frac{100.00}{4.50}$ yr. = $22\frac{2}{9}$ yr. = 22 yr. 2 mo. 20 da.

4

$1 × .12 (= 1% a mo.) = $ .12

$\frac{1.00}{.12}$ yr. = $8\frac{1}{3}$ yr. = 8 yr. 4 mo.

5

$15,000 × .10 = $1,500

$\frac{750}{1500}$ yr. = ½ yr. = 6 mo.

6

$340.25 × .07 = $23.81¾

$\frac{20.84}{23.81\frac{3}{4}}$ yr. = $\frac{7}{8}$ yr. = 10 mo. 15 da.

Problems in the Six General Cases of Interest.

1

Time, 20 mo. = .15, per cent
$42 ÷ .15 = $280, prin.

2

Time, $6\frac{1}{3}$ mo. = $.036\frac{17}{18}$, per cent
1 + $.036\frac{17}{18}$ = $1.036\frac{17}{18}$, amt. of 1
$1,725 × $1.036\frac{17}{18}$ = $1,788.73, amt.

3

Time, 30 mo. = .15, per cent
1 + .15 = 1.15, amt. of 1
$600.50 × 1.15 = $690.575, amt.

4

Time, 6 mo. = .03, per cent semiannually
$4,375 × .03 = $131.25, semi-annual int.

5

Time, $28\frac{13}{15}$ mo. = $.168\frac{7}{18}$, per cent
1 + $.168\frac{7}{18}$ = $1.168\frac{7}{18}$, amt. of 1
$1,477.59 ÷ $1.168\frac{7}{18}$ = $1,264.64, prin.

Page 312. **6**

Time, 68 mo. = .34, per cent
1 + .34 = 1.34, amt. of 1
$2,010 ÷ 1.34 = $1,500, prin.

7

1.20, amt. of 1 in 4 yr.
$800 ÷ 1.20 = $666.67, present worth.

8

$420 × .06 = $25.20, int. for 1 yr.
$\frac{134.40}{25.20}$ yr. = 5$\frac{1}{3}$ yr. = 5 yr. 4 mo.

9

$2,000 − $1,600 = $400, int.
$1,600 × .06 = $96, int. for 1 yr.
$\frac{400}{96}$ yr. = 4$\frac{1}{6}$ yr. = 4 yr. 2 mo.

10

Time, 2 mo. 15 da. = .2$\frac{1}{12}$ yr. = .002$\frac{1}{12}$, at 1%
$276 × .002$\frac{1}{12}$ = $ .575, int. at 1%
$4.60 ÷ 5.75 = $ .08 = 8%

11

Time, 365 × $1 = $365, int. for 1 yr.
$365 ÷ 9,125 = $ .04 = 4%

12

Time, 9.6 mo. = .056, per cent
$22.40 ÷ .056 = $400, loan.

13 *Page 312.*

Time, 20.8 mo. = .121$\frac{1}{3}$, per cent
$98.28 ÷ .121$\frac{1}{3}$ = $810, sum loaned

14

Time, 29$\frac{1}{15}$ mo. = .16$\frac{43}{45}$, per cent
1 + .16$\frac{43}{45}$ = 1.16$\frac{43}{45}$, amt. of 1
$840 × 1.16$\frac{43}{45}$ = $982.43, amt.

15

Time, 40$\frac{1}{3}$ mo. = .20$\frac{1}{6}$, per cent
1 + .20$\frac{1}{6}$ = 1.20$\frac{1}{6}$, amt. of 1
$1,698.50 ÷ 1.20$\frac{1}{6}$ = $1,413.45, prin.

16

Time, 9$\frac{7}{30}$ mo. = .076$\frac{17}{18}$, per cent
1 + .076$\frac{17}{18}$ = 1.076$\frac{17}{18}$, amt. of 1
$3,650 × 1.076$\frac{17}{18}$ = $3,930.85, amt.

17

$684 × .10 = $68.40, int. for 1 yr.
$\frac{103.68}{68.40}$ yr. = 1$\frac{49}{95}$ yr. = 1 yr. 6 mo. 6 da.

18

1 + .20 = 1.20, amt. of 1 at 20% advance.
$450 × 1.20 = $540, rec'd in payment by note.
1 yr. 3 mo. 15 da. = 15.5 mo. = 7$\frac{3}{4}$% = .07$\frac{3}{4}$.
1 + .07$\frac{3}{4}$ = 1.07$\frac{3}{4}$, amt. of 1 in 15.5 mo. @ 6%.
$540 × 1.07$\frac{3}{4}$ = $581.85, amt. of $540 in 15.5 mo.
$581.85 − $550 = $31.85, rec'd on note by buyer for the time he held it (1 yr. 3 mo. 15 da. − 8 mo. = 7$\frac{1}{2}$ mo.).
$\frac{\$31.85 \times 12}{7\frac{1}{2}}$ = $50.96, int. of $550 for 1 yr.
$50.96 ÷ 550 = $ .09$\frac{73}{275}$ = 9$\frac{73}{275}$%, buyer rec'd on his investment.
$550 − $540 = $10, int. I rec'd for 8 mo.
$\frac{\$10 \times 12}{8}$ = $15, int. of $540 for 1 yr.
$15 ÷ 540 = $ .02$\frac{7}{9}$ = 2$\frac{7}{9}$%, rate of int. I rec'd on note.

Page 313. **1**

Time, 320 da. = $\frac{320}{365}$ yr.
\$84.25 × .06 = \$5.055, int. for 1 yr.;
\$5.055 × $\frac{320}{365}$ = \$4.43

2

Time, 70 da. = $\frac{70}{365}$ yr.
\$400 × .06 = \$24, int. for 1 yr.;
\$24 × $\frac{70}{365}$ = \$4.60

3

Time, 1 yr. 214 da. = $1\frac{214}{365}$ yr.
\$3,225 × .07 = \$225.75, int. for 1 yr.;
\$225.75 × $1\frac{214}{365}$ = \$356.25

4

Time, 2 yr. 83 da. = $2\frac{83}{365}$ yr.
\$1,852.60 × .05 = \$92.63, int. for 1 yr.;
\$92.63 × $2\frac{83}{365}$ = \$206.32

5

Time, 2 yr. 332 da. = $2\frac{332}{365}$ yr.
\$7,325 × .06 = \$439.50, int. for 1 yr.;
\$439.50 × $2\frac{332}{365}$ = \$1,278.76

6

Time, 4 yr. 157 da. = $4\frac{157}{365}$ yr.
\$32,782.52 × .06 = \$1,966.951, int. for 1 yr.;
\$1,966.951 × $4\frac{157}{365}$ = \$8,713.86

7

Time, 127 da. = $\frac{127}{365}$ yr.
\$22,064.60 × .07 = \$1,544.522, int. for 1 yr.;
\$1,544.522 × $\frac{127}{365}$ = \$540.16

8

Time, 21 da. = $\frac{21}{365}$ yr.
\$8,673 × .06 = \$520.38, int. for 1 yr.;
\$520.38 × $\frac{21}{365}$ = \$29.94

9

Time, 1 da. = $\frac{1}{365}$ yr.
\$15,000 × .06 = \$900, int. for 1 yr.;
\$900 × $\frac{1}{365}$ = \$2.46

10

Time, 152 da. = $\frac{152}{365}$ yr.
\$2,000 × .05 = \$100, int. for 1 yr.;
\$100 × $\frac{152}{365}$ = \$41.64

11. Answer depends upon time and rate of interest.

12

Time, 94 da. = $\frac{94}{365}$ yr.
\$9,355.25 × .10 = \$935.525, int. for 1 yr.;
\$935.525 × $\frac{94}{365}$ = \$240.27

13

Time, 63 da. = $\frac{63}{365}$ yr.
\$867.40 × .04½ = \$39.033, int. for 1 yr.;
\$39.033 × $\frac{63}{365}$ = \$6.74

14

Time, 93 da. = $\frac{93}{365}$ yr.
\$91.65 × .08 = \$7.332, int. for 1 yr.;
\$7.332 × $\frac{93}{365}$ = \$1.86

15

Time, 3 da. = $\frac{3}{365}$ yr.
\$100,000 × .15 = \$15,000, int. for 1 yr.;
\$15,000 × $\frac{3}{365}$ = \$122.95

DISCOUNT.

Page 315.

1

$300 × .02½ = $7.50

2

$1,250 × .05 = $62.50

Page 316.

3

$862.50 × .03¼ = $28.03

4

$219.75 × .02⅛ = $4.67

5

$2.50 × (1 − .30 =) .70 = $1.75, cost

6

$8.90 × (1 − .60 =) .40 = $3.56
$3.56 × (1 − .25 =) .75 = $2.67, cost

7

$1.50 × (1 − .40 =) .60 = $ .90
$ .90 × (1 − .05 =) .95 = $ .855, cost per doz.
12 × $ .855 = $10.26, cost per gro.

8

$33 × (1 − .16⅔ =) .83⅓ = $27.50
$27.50 × (1 − .03 =) .97 = $26.68, cost

9

Invoice, $852.—
Com. disct., $852 × .03 = 25.56
Proceeds, $826.44

10

Invoice, $972.83
Com. disct., $972.83 × .04 = 38.91
Proceeds, $933.92

11

Invoice, $1,500.—
Com. disct., $1,500 × .01⅜ = 20.62½
Proceeds, $1,479.37½

12

Invoice, $2,450.—
Com. disct., $2,450 × .03 = 73.50
Proceeds, $2,376.50

Page 317.

1

Time, 3 mo. 3 da. = 3.1 mo.
$250 × .10 = $25, int. for 1 yr.
$\frac{\$25 \times 3.1}{12} = \$6.46$, bank discount.

2

Time, 6 mo. 3 da. = 6.1 mo.
$81.50 × .08 = $6.52, int. for 1 yr.
$\frac{\$6.52 \times 6.1}{12} = \$3.31$, bank disct.

3

Time, 18 da. = .6 mo.
$1,640 × .06 = $98.40, int. for 1 yr.
$\frac{\$98.40 \times .6}{12} = \$4.92$, bank disct.

4

Time, 63 da. = 2.1 mo.
$2,375 × .07 = $166.25, int. for 1 yr.
$\frac{\$166.25 \times 2.1}{12} = \$29.09$, bank disct.

Page 317. **5**

Time, 4 mo. 3 da. = 4.1 mo.; \$495 × .05 = \$24.75, int. for 1 yr.

$$\frac{\$24.75 \times 4.1}{12} = \$8.46, \text{ bank discount.}$$

6

Time, 33 da. = 1.1 mo.

\$600 × .06 = \$36, int. for 1 yr.

$$\frac{\$36 \times 1.1}{12} = \$3.30, \text{ bank discount.}$$

\$600 − \$3.30 = \$596.70, proceeds.

7

Time, 93 da. = 3.1 mo.

\$321 × .08 = \$25.68, int. for 1 yr.

$$\frac{\$25.68 \times 3.1}{12} = \$6.634, \text{ bank disct.}$$

\$321 − \$6.63 = \$314.37, proceeds.

8

Time, 4 mo. 3 da. = 4.1 mo.

\$3,500 × .06 = \$210, int. for 1 yr.

$$\frac{\$210 \times 4.1}{12} = \$71.75, \text{ bank disct.}$$

\$3,500 − \$71.75 = \$3,428.25, proceeds.

9

Time, 13 da. = $\frac{13}{30}$ mo.

\$418.50 × .10 = \$41.85, int. for 1 yr.

$$\frac{\$41.85 \times \frac{13}{30}}{12} = \$1.51, \text{ bank disct.}$$

\$418.50 − \$1.51 = \$416.99, proceeds.

10

Time, 93 da. = 3.1 mo.

\$500 × .06 = \$30, int. for 1 yr.

$$\frac{\$30 \times 3.1}{12} = \$7.75, \text{ bank discount.}$$

\$500 − \$7.75 = \$492.25, proceeds.

11

Time, 63 da. = 2.1 mo.

\$850.31 × .05 = \$42.52, int. for 1 yr.

$$\frac{\$42.52 \times 2.1}{12} = \$7.44, \text{ bank disct.}$$

\$850.31 − \$7.44 = \$842.87, proceeds.

12

Time, 4 mo. 3 da. = 4.1 mo.

\$10,000 × .07 = \$700, int. for 1 yr.

$$\frac{\$700 \times 4.1}{12} = \$239.17, \text{ bank disct.}$$

\$10,000 − \$239.17 = \$9,760.83, proceeds.

13

Time, 2 mo. 3 da. = 2.1 mo.

\$1,250 × .08 = \$100, int. for 1 yr.

$$\frac{\$100 \times 2.1}{12} = \$17.50, \text{ bank disct.}$$

\$1,250 − \$17.50 = \$1,232.50, proceeds.

Page 318. **1**

2 mo. = .01, per cent;

1 + .01 = 1.01, amt. of 1;

\$100 ÷ 1.01 = \$99.009, present worth;

\$100 − \$99.009 = \$ .99, true discount.

2

7 mo. 18 da. = 7.6 mo. = $.06\frac{1}{3}$, %;

1 + $.06\frac{1}{3}$ = $1.06\frac{1}{3}$, amt. of 1;

\$854 ÷ $1.06\frac{1}{3}$ = \$803.13, present worth;

\$854 − \$803.13 = \$50.87, true discount.

Page 318.

3

1 yr. 6 mo. = 18 mo. = .10½, per cent;
1 + .10½ = 1.10½, amt. of 1;
\$69.50 ÷ 1.10½ = \$62.90, present worth;
\$69.50 − \$62.90 = \$6.60, true discount.

4

4 mo. 23 da. = 4$\frac{23}{30}$ mo. = .02$\frac{23}{60}$, per cent;
1 + .02$\frac{23}{60}$ = 1.02$\frac{23}{60}$, amt. of 1;
\$732.25 ÷ 1.02$\frac{23}{60}$ = \$715.20, present worth;
\$732.25 − \$715.20 = \$17.05, true discount.

5

2 yr. = .10, per cent;
1 + .10 = 1.10, amt. of 1;
\$1,000 ÷ 1.10 = \$909.09, present worth.

6

8 mo. 24 da. = 8.8 mo. = .044, %;
1 + .044 = 1.044, amt. of 1;
\$3,500 ÷ 1.044 = \$3,352.49, present worth.

7

1 yr. 10 mo. 15 da. = 22.5 mo. = .18¾, per cent;
1 + .18¾ = 1.18¾, amt. of 1;
\$1,275 ÷ 1.18¾ = \$1,073.68, present worth.

8

8 mo. 20 da. = 8⅔ mo. = .04⅓, per cent;
1 + .04⅓ = 1.04⅓, amt. of 1;
\$91.42 ÷ 1.04⅓ = \$87.62, present worth.

Page 319.

9

1 yr. 8 mo. 3 da. = 20.1 mo. = .1005, per cent;
1 + .1005 = 1.1005, amt. of 1;
\$925 ÷ 1.1005 = \$840.53, present worth;
\$925 − \$840.53 = \$84.47, true discount.

10

7 mo. 3 da. = 7.1 mo. = .026⅝, per cent;
1 + .026⅝ = 1.026⅝, amt. of 1;
\$2,992.54 ÷ 1.026⅝ = \$2,914.93, present worth;
\$2,992.54 − \$2,914.93 = \$77.61, true discount.

11

4 yr. 3 da. = 48.1 mo. = .2004⅙, per cent;
1 + .2004⅙ = 1.2004⅙, amt. of 1;
\$600 ÷ 1.2004⅙ = \$499.83, present worth;
\$600 − \$499.83 = \$100.17, true discount.

12

1 yr. 6 mo. 3 da. = 18.1 mo. = .105$\frac{7}{12}$, per cent;
1 + .105$\frac{7}{12}$ = 1.105$\frac{7}{12}$, amt. of 1;
\$560 ÷ 1.105$\frac{7}{12}$ = \$506.52, present worth;
\$560 − \$506.52 = \$53.48, true discount.

PROBLEMS IN DISCOUNT.

Page 319.

1

$957.60 × (1 − .05 =) .95 = $909.72, cost.

2

9 mo. 3 da. = 9.1 mo. = .045½, per cent;
1 + .045½ = 1.045½, amt. of 1;
$1,375.70 ÷ 1.045½ = $1,315.83, present worth;
$1,375.70 − $1,315.83 = $59.87, discount.

3

6 mo. 3 da. = 6.1 mo.
$4,500 × .07 = $315, int. for 1 yr.

$$\frac{\$315 \times 6.1}{12} = \$160.125, \text{ discount};$$

$4,500 − $160.125 = $4,339.87½, proceeds.

4

6 mo. 3 da. = 6.1 mo. = .040⅔, per cent;
1 − .040⅔ = .959⅓, present worth of 1;
$2,250 ÷ .959⅓ = $2,345.38, face of the note.

5

$1,890 × (1 − .10 =) .90 = $1,701
$1,701 × (1 − .05 =) .95 = $1,615.95

6

4 mo. 3 da. = 4.1 mo. = .0205, per cent;
$4,440 × (1 − .05 =) .95 = $4,218, amt. to be borrowed.
1 − .0205 = .9795, proceeds of 1;
$4,218 ÷ .9795 = $4,306.28, face of note;
$4,440 − $4,306.28 = $133.72 gained by cashing the bill.

7

4 mo. 3 da. = 4.1 mo. = .0205, per cent;
1 − .0205 = .9795, proceeds of 1;
$2,685 ÷ .9795 = $2,741.19, face of note.

Page 319.

8

$950 – $500 = $450, unpaid.
2 yr. – 8 mo. = 16 mo. = .12, %
1 + .12 = 1.12, amt. of 1;
$450 ÷ 1.12 = $401.79, amt. paid.

10

1 – .25 = .75; 1 – .10 = .90
1 × .75 = .75; .75 × .90 = .675
1 × .90 = .90; .90 × .75 = .675
There is no difference.

9

The answer to this problem depends upon rate of interest in the State in which the note was drawn.

COMPOUND INTEREST.

Page 320.

1

$624.45	Prin.
1.06	1 + rate.
$661.917	Amt. for 1 yr., or Prin. for 2d yr.
1.06	1 + rate.
$701.632	Amt. for 2 yr., or Prin. for 3d yr.
1.06	1 + rate.
$743.73	Amt. for 3 yr.

2

$624.45	Prin.
1.05	1 + rate.
$655.672	Amt. for 1 yr., or Prin. for 2d yr.
1.05	1 + rate.
$688.455	Amt. for 2 yr., or Prin. for 3d yr.
1.05	1 + rate.
$722.88	Amt. for 3 yr.

3

1 + .06 = 1.06, amt. of 1 for 1 yr. 1 + .01 = 1.01, amt. of 1 for 2 mo.
$25.75 × 1.06 = $27.295, amt. for 1 yr.
27.295 × 1.06 = 28.932, " " 2 "
28.932 × 1.06 = 30.667, " " 3 "
30.667 × 1.06 = 32.507, " " 4 "
32.507 × 1.01 = 32.83, " " 4 " 2 mo.

4

1 + .04 = 1.04, amt. of 1 for 1 yr. 1 + .00⅔ = 1.00⅔, amt. of 1 for 2 mo.
$25.75 × 1.04 = $26.78, amt. for 1 yr.
26.78 × 1.04 = 27.851, " " 2 "
27.851 × 1.04 = 28.965, " " 3 "
28.965 × 1.04 = 30.123, " " 4 "
30.123 × 1.00⅔ = 30.32, " " 4 " 2 mo.

Page 320. **5**

4% annually = 2% semi-annually. 1.02 = amt. of 1 semi-annually.

$856.75 × 1.02 = $873.885, amt. for ½ yr.
873.885 × 1.02 = 891.362, " " 1 "
891.362 × 1.02 = 909.189, " " 1½ "
909.189 × 1.02 = 927.37, " " 2 "

6

6% annually = 1.5% quarterly. 1.015 = amt. of 1 quarterly.

$364.50 × 1.015 = $369.967, amt. for ¼ yr.
369.967 × 1.015 = 375.516, " " ½ "
375.516 × 1.015 = 381.148, " " ¾ "
381.148 × 1.015 = 386.865, " " 1 "
386.865 × 1.015 = 392.667, " " 1¼ "
392.667 × 1.015 = 398.556, " " 1½ "
398.556 × 1.015 = 404.534, " " 1¾ "
404.534 × 1.015 = 410.602, " " 2 "
410.602 × 1.015 = 416.761, " " 2¼ "
416.761 × 1.015 = 423.02, " " 2½ "

Page 321. **7**

1 + .07 = 1.07, amt. of 1 for 1 yr.

$ 781 × 1.07 = $ 835.67, amt. for 1 yr.
835.67 × 1.07 = 894.166, " " 2 "
894.166 × 1.07 = 956.757, " " 3 "
956.757 × 1.07 = 1,023.729, " " 4 "
1,023.729 × 1.07 = 1,095.39, " " 5 "
Deduct principal, 781.—
Compound interest, $314.39

8

1 + .035 = 1.035, amt. of 1 for 1 yr.

$781 × 1.035 = $808.335, amt. for 1 yr.
808.335 × 1.035 = 836.626, " " 2 "
836.626 × 1.035 = 865.907, " " 3 "
865.907 × 1.035 = 896.213, " " 4 "
896.213 × 1.035 = 927.58, " " 5 "
Deduct principal, 781.—
Compound interest, $146.58

9

Page 321.

4% annually = 1% quarterly. 1.01 = amt. of 1 quarterly.

$459.26 × 1.01 = $463.852, amt. for ¼ yr.
463.852 × 1.01 = 468.49, " " ½ "
468.49 × 1.01 = 473.174, " " ¾ "
473.174 × 1.01 = 477.905, " " 1 "
477.905 × 1.01 = 482.684, " " 1¼ "
482.684 × 1.01 = 487.51, " " 1½ "
487.51 × 1.01 = 492.385, " " 1¾ "
492.385 × 1.01 = 497.308, " " 2 "
497.308 × 1.01 = 502.281, " " 2¼ "
502.281 × 1.01 = 507.303, " " 2½ "
507.303 × 1.01 = 512.376, " " 2¾ "
512.376 × 1.01 = 517.499, " " 3 "
517.499 × 1.01 = 522.67, " " 3¼ "
Deduct principal, 459.26
Compound interest, $63.42

10

5% annually=2.5% semi-annually. 1.025=amt. of 1 semi-annually.

$437.50 × 1.025 = $448.437, amt. for ½ yr.
448.437 × 1.025 = 459.647, " " 1 "
459.647 × 1.025 = 471.14, " " 1½ "
Deduct principal, 437.50
Compound interest, $33.64

11

1.01 = amt. of 1 for 1 mo.

$575 × 1.01 = $580.75, amt. for 1 mo.
580.75 × 1.01 = 586.557, " " 2 "
586.557 × 1.01 = 592.422, " " 3 "
592.422 × 1.01 = 598.346, " " 4 "
598.346 × 1.01 = 604.329, " " 5 "
604.329 × 1.01 = 610.372, " " 6 "
610.372 × 1.01 = 616.475, " " 7 "
616.475 × 1.01 = 622.639, " " 8 "
622.639 × 1.01 = 628.865, " " 9 "
628.865 × 1.01 = 635.153, " " 10 "
635.153 × 1.01 = 641.504, " " 11 "
641.504 × 1.01 = 647.92, " " 12 "
Deduct principal, 575.—
Compound interest, $72.92

Page 321. **12**

1 + .04 = 1.04, amt. of 1 for 1 yr.
$4,275 × 1.04 = $4,446, amt. for 1 yr.
4,446 × 1.04 = 4,623.84, " " 2 "
4,623.84 × 1.04 = 4,808.793, " " 3 "
4,808.793 × 1.04 = 5,001.144, " " 4 "
5,001.144 × 1.04 = 5,201.189, " " 5 "
5,201.189 × 1.04 = 5,409.24, " " 6 "
Deduct principal, 4,275.—
Compound interest, $1,134.24
$4,275 × .04 × 6 = 1,026, simple interest for 6 yr.
Difference, $108.24

Article 123.

SAVINGS-BANK ACCOUNTS.

Dr. First interest period, July 1, 1881 to Jan. 1, 1882. **Cr.**

1881			*1881*		
July 1,	$231.50		Nov. 10,		$ 87.50
Sept. 15,	95.—				
Dec. 1,	50.—	$376.50			
Int. on $231.50 for 6 mo.,		4.63	Balance, Jan. 1, 1882,		293.63
		$381.13			$381.13

Second interest period, Jan. 1 to July 1, 1882.

1882			*1882*		
Jan. 1, Balance,	$293.63		Jan. 5,	$12.—	
Mar. 20,	69.25		April 18,	44.—	$ 56.—
May 9,	20.—	$382.88			
Int. on $281.63 for 6 mo.,		5.63	Balance, July 1, 1882,		332.51
		$388.51			$388.51

Third interest period, July 1, 1882 to Jan. 1, 1883.

1882			*1882*		
July 1, Balance,	$332.51		Aug. 25,	$110.75	
" 1,	30.75		*1883*		
Oct. 12,	24.—				
Nov. 27,	7.50	$394.76	Jan. 1,	8.25	$119.—
Int. on $332.51 for 6 mo.		6.65	" " Balance,		282.41
		$401.41			$401.41
1883					
Jan. 1, Balance, $282.41					

PARTIAL PAYMENTS.

1

Page 323.

$4,750 – $2,100 (cash) = $2,650, 1st principal.

Interest Periods.	*Amts. of 1.*	*Principals.*	*Amounts.*	*Pay'ts.*
1 yr.	1.06	$2,650	$2,809.—	$1,200
1 "	1.06	1,609	1,705.54	

2

Dates.			*Interest Periods.*			*Amts. of 1.*	*Principals.*	*Amounts.*	*Pay'ts.*
1880 yr.	11 mo.	26 da.							
to '81	6	25	6 mo.	29 da.	= 6.9⅔ mo.	1.03 29/60	$1,780.—	$1,842.—	$160
" '81	11	1	4	6	= 4.2 mo.	1.021	1,682.—	1,717.32	525
" '82	3	11	4	10	= 4⅓ mo.	1.02⅙	1,192.32	1,218.15	

3

Dates.			*Interest Periods.*			*Amts. of 1.*	*Principals.*	*Amounts.*	*Pay'ts.*
1881 yr.	4 mo.	15 da.							
to '82	1	24	9 mo.	9 da.	= 9.3 mo.	1.0465	$450.—	$470.93	$200
" '82	11	8	9	14	= 9.4⅔ mo.	1.047⅓	270.93	283.75	

4

Dates.			*Interest Periods.*			*Amts. of 1.*	*Principals.*	*Amounts.*	*Pay'ts.*
1879 yr.	10 mo.	31 da.							
to '80	5	28	6 mo.	27 da.	= 6.9 mo.	1.040¼	$12,500.—	$13,003.13	$900
" '81	1	1	7	8	= 7.1 mo.	1.041 5/12	12,103.13	12,604.40	650
" '81	7	14	6	13	} =10.9⅓ mo.	1.063 7/9	11,954.40	12,716.83	{375
" '81	11	29	4	15					745
" '82	8	11	8	12	} =13.7⅔ mo.	1.060 11/36	11,596.83	12,528.12	530
" '83	1	22	5	11					
							11,998.12		

5

Dates.			*Interest Periods.*			*Amts. of 1.*	*Principals.*	*Amounts.*	*Pay'ts.*
1880 yr.	3 mo.	14 da.							
to '81	10	31	19 mo.	17 da.	} =26.9 mo.	1.1345	$765.—	$867.89	{$ 50
" '82	6	11	7	10					285
" '82	9	25	3	14	= 3.4⅔ mo.	1.017⅓	532.89	542.13	

6

Dates.			*Interest Periods.*			*Amts. of 1.*	*Principals.*	*Amounts.*	*Pay'ts.*
1881 yr.	12 mo.	3 da.							
to '82	7	2	6 mo.	29 da.	= 6.9⅔ mo.	1.034⅚	$2,500.—	$2,587.08	$350
" '82	11	8	4	6	= 4.2 mo.	1.021	2,237.08	2,284.06	675
" '83	3	18	4	10	= 4⅓ mo.	1.021⅔	1,609.06	1,643.92	

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1

Amt. of principal for 1 yr., $1,250 × 1.06 = $1,325.—
365 da. − 155 da. = 210 da. = $\frac{210}{365}$ yr.
Int. of payment for 1 yr , $625 × .06 = $37.50
Amt. of payment for 210 da., $\$625 + \frac{\$37.50 \times 210}{365} =$ 646.58
Due at end of yr., $678.42

2

Time, 1 yr. 196 da. Principal, $3,125.—
Int. of principal for 1 yr., $3,125 × .06 = $187.50
" " " " 196 da., $\frac{\$187.50 \times 196}{365} =$ 100.68 288.18
Amt. for 1 yr. 196 da., $3,413.18
Payment at interest 1 yr. 17 da. Payment, $1,450.—
Int. of payment for 1 yr., $1,450 × .06 = $87.—
" " " " 17 da., $\frac{\$87 \times 17}{365} =$ 4.05 91.05 1,541.05
Due at settlement, $1,872.13

3

Time, 1 yr. 241 da. Principal, $8,000.—
Int. of principal for 1 yr., $8,000 × .04½ = $360.—
" " " " 241 da., $\frac{\$360 \times 241}{365} =$ 237.70 597.70
Amt. for 1 yr. 241 da., $8,597.70
1st pay't at int. 1 yr. 6 da. Pay't, $3,500.—
Int. of pay't for 1 yr., $3,500 × .04½ = $157.50
Int. of pay't for 6 da., $\frac{\$157.50 \times 6}{365} =$ 2.59 160.09 $3,660.09
2d payment at int. 173 da. Pay't, $2,750.—
Int. of pay't for 1 yr., $2,750 × .04½ = $123.75
Int. of pay't for 173 da., $\frac{\$123.75 \times 173}{365} =$ 58.65 $2,808.65 6,468.74
Due at settlement, $2,128.96

Page 325.

1

Int. due on principal at end of each year, $800 × .06 = $48
1 yr.'s int. draws simple int. for 4 yr. + 3 yr. + 2 yr. + 1 yr. = 10 yr.

Page 325.

10 yr. at 6% = 10 × .06 = .60, per cent.
Simple int. on 1 yr.'s int. for 10 yr., $48 × .60 = $ 28.80
Int. on principal for 5 yr., $800 × .06 × 5 = 240.—
Total interest, $268.80

2

Int. due on principal at end of each year, $241 × .06 = $14.46
1 yr.'s int. draws simple int. for 3 yr. 2 mo. + 2 yr. 2 mo. + 1 yr. 2 mo. + 2 mo. = 6 yr. 8 mo.
6 yr. 8 mo. = 80 mo. = .40, per cent.
Simple int. on 1 yr.'s int. for 80 mo., $14.46 × .40 = $ 5.78
4 yr. 2 mo. = 50 mo. = .25, per cent.
Int. on principal for 50 mo., $241 × .25 = 60.25
Total interest, $66.03

3

Int. due on principal at end of each year, $124 × .06 = $7.44
1 yr.'s int. draws simple int. for 5 yr. 8 mo. + 4 yr. 8 mo. + 3 yr. 8 mo. + 2 yr. 8 mo. + 1 yr. 8 mo. + 8 mo. = 19 yr.
19 yr. at 6% = 19 × .06 = 1.14, per cent.
Simple int. on 1 yr.'s int. for 19 yr., $7.44 × 1.14 = $ 8.48
6 yr. 8 mo. = 80 mo. = .40, per cent.
Int. on principal for 80 mo., $124 × .40 = 49.60
Total interest, $58.08

4

Int. due on principal at end of each year, $172 × .06 = $10.32
1 yr.'s int. draws simple int. for 2 yr. 3 mo. 3 da. + 1 yr. 3 mo. 3 da. + 3 mo. 3 da. = 3 yr. 9 mo. 9 da.
3 yr. 9 mo. 9 da. = 45.3 mo. = .2265, per cent.
Simple int. on 1 yr.'s int. for 45.3 mo., $10.32 × .2265 = $ 2.337
3 yr. 3 mo. 3 da. = 39.1 mo. = .1955, per cent.
Int. on principal for 39.1 mo., $172 × .1955 = 33.626
Total interest, $35.96

5

Int. due on principal at end of each year, $387.50 × .06 = $23.25
1 yr.'s int. draws simple int. for 4 yr. 4 mo. 15 da. + 3 yr. 4 mo. 15 da. + 2 yr. 4 mo. 15 da. + 1 yr. 4 mo. 15 da. + 4 mo. 15 da. = 11 yr. 10 mo. 15 da.
11 yr. 10 mo. 15 da. = 142.5 mo. = .7125, per cent.
Simple int. on 1 yr.'s int. for 142.5 mo., $23.25 × .7125 = $ 16.565
5 yr. 4 mo. 15 da. = 64.5 mo. = .3225, per cent.
Int. on principal for 64.5 mo., $387.50 × .3225 = 124.968
Total interest, $141.53

Page 325. 6

Int. due on principal at end of each year, \$574.45 × .06 = \$34.467

1 yr.'s int. draws simple int. for 2 yr. 9 mo. 14 da. + 1 yr. 9 mo. 14 da. + 9 mo. 14 da. = 5 yr. 4 mo. 12 da.

5 yr. 4 mo. 12 da. = 64.4 mo. = .322, per cent.

Simple int. on 1 yr.'s int. for 64.4 mo., \$34.467 × .322 = \$ 11.098

3 yr. 9 mo. 14 da. = 45.4⅔ mo. = .227⅓, per cent.

Int. on principal for 45.4⅔ mo., \$574.45 × .227⅓ = 130.59

Total interest, \$141.69

7

Int. due on principal at end of each year, \$96.84 × .06 = \$5.81

1 yr.'s int. draws simple int. for 2 yr. 7 mo. 13 da. + 1 yr. 7 mo. 13 da. + 7 mo. 13 da. = 4 yr. 10 mo. 9 da.

4 yr. 10 mo. 9 da. = 58.3 mo. = .2915, per cent.

Simple int. on 1 yr.'s int. for 58.3 mo., \$5.81 × .2915 = \$ 1.69

3 yr. 7 mo. 13 da. = 43.4⅓ mo. = .217⅙, per cent.

Int. on principal for 43.4⅓ mo., \$96.84 × .217⅙ = 21.03

Total interest, \$22.72

8

Int. due on principal at end of each year, \$1,000.46 × .06 = \$60.027

1 yr.'s int. draws simple int. for 4 yr. 3 mo. 9 da. + 3 yr. 3 mo. 9 da. + 2 yr. 3 mo. 9 da. + 1 yr. 3 mo. 9 da. + 3 mo. 9 da. = 11 yr. 4 mo. 15 da.

11 yr. 4 mo. 15 da. = 136.5 mo. = .6825, per cent.

Simple int. on 1 yr.'s int. for 136.5 mo., \$60.027 × .6825 = \$ 40.968

5 yr. 3 mo. 9 da. = 63.3 mo. = .3165, per cent.

Int. on principal for 63.3 mo., \$1,000.46 × .3165 = 316.642

Total interest, \$357.61

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Int. due on principal at end of each year, \$600 × .06 = \$36

1 yr.'s int. draws simple int. for 3 yr. 3 mo. 15 da. + 2 yr. 3 mo. 15 da. + 1 yr. 3 mo. 15 da. + 3 mo. 15 da. = 7 yr. 2 mo.

7 yr. 2 mo. = 86 mo. = .43, per cent.

Simp. int. on 1 yr.'s int. for 86 mo., \$36 × .43 = \$ 15.48

4 yr. 3 mo. 15 da. = 51.5 mo. = .2575, per cent.

Int. on principal for 51.5 mo., \$600 × .2575 = 154.50

Principal \$600 + total interest \$169.98 = \$769.98, amt.

10 ***Page 326.***

Int. due on principal at end of each year, $2,000 × .06 = $120
1 yr.'s int. draws simple int. for 1 yr. 7 mo. 20 da. + 7 mo. 20 da. = 2 yr. 3 mo. 10 da.
2 yr. 3 mo. 10 da. = 27⅓ mo. = .13⅔, per cent.
Simple int. on 1 yr.'s int. for 27⅓ mo., } $120 × .13⅔ = $ 16.40
2 yr. 7 mo. 20 da. = 31⅔ mo. = .15⅚, per cent.
Int. on principal for 31⅔ mo., $2,000 × .15⅚ = 316.67
Principal $2,000 + total interest $333.07 = $2,333.07, amt.

11

The result depends on the year, month, and day on which the problem is solved.

BONDS.

1 ***Page 328.***

.67 + .00½ = .67½ = .675, market value of 1.
.675 × $500 = $337.50

2

1.18⅛ + .00⅛ = 1.18¼, market value of 1.
1.18¼ × $100 = $118.25

3

.91 + .00¼ = .91¼ = .9125, value of 1.
$21,535 ÷ .9125 = $23,600 = 236 bonds of $100 each.

4

1.15¾ + .00¼ = 1.16, value of 1.
$3,944 ÷ 1.16 = $3,400 = 34 bonds of $100 each.

5

.89⅝ + .00⅛ = .89¾ = .8975, value of 1.
$21,540 ÷ .8975 = $24,000 = 240 bonds of $100 each.

6

1.10 + .00⅛ = 1.10⅛ = 1.10125, value of 1.
$7,048 ÷ 1.10125 = $6,400 = 64 bonds of $100 each.

Page 328.

7

$115 invested in Mich. 7's draws $7 interest, and
$112 " " Mo. 6's " $6 "
$\$7 \div 115 = \$.06\frac{2}{23} = 6\frac{2}{23}\%$ on Mich. 7's, and
$\$6 \div 112 = \$.05\frac{5}{14} = 5\frac{5}{14}\%$ " Mo. 6's.

The difference is $\frac{235}{322}\%$ in favor of Mich. 7's.

8

$119 invested in Ga. 7's draws $7 interest, and
$116 " " Va. 6's " $6 "
$\$7 \div 119 = \$.05\frac{105}{119} = 5\frac{105}{119}\%$ on Ga. 7s, and
$\$6 \div 116 = \$.05\frac{5}{29} = 5\frac{5}{29}\%$ " Va. 6's.

The difference is $\frac{2450}{3451}\%$ in favor of Ga. 7's.

9

$102 invested in 5% bonds draws $5 interest, and
$\$87\frac{1}{8}$ " " $3\frac{1}{2}\%$ " " $\$3\frac{1}{2}$ "
$\$5 \div 102 = \$.04\frac{46}{51} = 4\frac{46}{51}\%$ on 5% bonds, and
$\$3.50 \div 87.125 = \$.04\frac{12}{697} = 4\frac{12}{697}\%$ " $3\frac{1}{2}\%$ "

The difference is $\frac{1850}{2091}\%$ in favor of the 5% bonds.

10

$102 invested in Government 4's draws $4 interest, and
$113 " " " $4\frac{1}{2}$'s " $\$4\frac{1}{2}$ "
$\$4 \div 102 = \$.03\frac{47}{51} = 3\frac{47}{51}\%$ on 4% bonds, and
$\$4.50 \div 113 = \$.03\frac{111}{113} = 3\frac{111}{113}\%$ " $4\frac{1}{2}\%$ "

The difference is $\frac{350}{5763}\%$ in favor of the $4\frac{1}{2}\%$ bonds.

11

Par value of bonds, $3,000.
$1 + .08\frac{1}{4} = 1.08\frac{1}{4}$, cost of 1.
$1.08\frac{1}{4} \times \$3,000 = \$3,247.50$

12

$1 - .04 = .96$, per cent of par value.
$\$20,352 \div .96 = \$21,200$

13

$105 investment draws $6 int.
$\$6 \div 105 = \$.05\frac{5}{7} = 5\frac{5}{7}\%$

14

$111 investment draws $6 int.
$\$6 \div 111 = \$.05\frac{15}{37} = 5\frac{15}{37}\%$

EQUATION OF PAYMENTS.

Page 329.

1

Int. of \$200 for 3 mo. = int. of \$1 for 200 × 3 mo., or 600 mo.
“ “ 240 “ $3\frac{1}{2}$ “ = “ “ 1 “ 240 × $3\frac{1}{2}$ “ “ 840 “
“ “ 320 “ 5 “ = “ “ 1 “ 320 × 5 “ “ 1,600 “
“ “ \$760 “ ? “ = “ “ 1 “ $\frac{1}{760}$ of 3,040 “

3,040 mo. ÷ 760 = 4 mo., equated time.

2

\$425 cash.
Int. of 150 for 6 mo. = int. of \$1 for 150 × 6 mo., or 900 mo.
“ “ 275 “ 9 “ = “ “ 1 “ 275 × 9 “ “ 2,475 “
\$850 “ ? “ = “ “ 1 “ $\frac{1}{850}$ of 3,375 “

3,375 mo. ÷ 850 = $3\frac{29}{30}$ mo. = 3 mo. 29 da., equated time.

3

Int. of \$ 700 for 73 da. (=Jan. 1 to Mar. 15) = int. of \$1 for 700 × 73 da., or 51,100 da.
“ “ 250 “ 90 “ (= “ 1 “ Apr. 1) = “ “ 1 “ 250 × 90 “ “ 22,500 “
“ “ 825 “ 104 “ (= “ 1 “ “ 15) = “ “ 1 “ 825 × 104 “ “ 85,800 “
“ “ 1,000 “ 129 “ (= “ 1 “ May 10) = “ “ 1 “ 1,000 × 129 “ “ 129,000 “
“ “ 1,425 “ 151 “ (= “ 1 “ June 1) = “ “ 1 “ 1,425 × 151 “ “ 215,175 “
“ “ \$4,200 “ ? “ = “ “ 1 “ $\frac{1}{4200}$ of 503,575 “

503,575 da. ÷ 4,200 = 120 da., equated time; and Jan. 1 + 120 da. = May 1.

EXCHANGE.

Page 332.

1

$1 + .005 = 1.005$
$\$250 \times 1.005 = \$251.25$

2

$1 + .02\frac{1}{2} = 1.02\frac{1}{2}$
$\$456.50 \times 1.02\frac{1}{2} = \$467.91$

3

$1 + .15 = 1.15$
$\$1,325 \times 1.15 = \$1,523.75$

4

$1 - .02\frac{1}{2} = .97\frac{1}{2}$
$\$631 \times .97\frac{1}{2} = \$615.23$

5

$1 - .15 = .85$
$\$389 \times .85 = \$330.65$

6

$1 - .01\frac{1}{2} = .98\frac{1}{2}$
$\$2,750 \times .98\frac{1}{2} = \$2,708.75$

7

$1 + .01\frac{1}{4} = 1.01\frac{1}{4}$
$\$116.44 \div 1.01\frac{1}{4} = \$115$

8

$1 + .00\frac{1}{8} = 1.00\frac{1}{8}$
$\$1,000 \div 1.00\frac{1}{8} = \$998.75$

Page 332.

9

1 − .005 = .995
$835.62 ÷ .995 = $839.82

10

1 − .02⅜ = .97⅝
$3,521 ÷ .97⅝ = $3,606.66

11

63 da. = 2.1 mo. = .007, per cent.
$500 × .007 = $3.50, int. for 63 da.
$500 × .005 = $2.50, premium.
$500 − $3.50 = $496.50, present worth.
$496.50 + $2.50 = $499, cost.

12

33 da. = 1.1 mo. = .0055, per cent.
$1,732 × .0055 = $9.526, int. for 33 da.
$1,732 × .00⅛ = $2.165, premium.
$1,732 − $9.526 = $1,722.474, present worth.
$1,722.474 + $2.165 = $1,724.64, cost.

13

13 da. = .004⅓, per cent.
$2,000 × .004⅓ = $8.66⅔, int. for 13 da.
$2,000 × .00¼ = $5, discount.
$2,000 − $8.66⅔ = $1,991.33⅓, present worth.
$1,991.33⅓ − $5 = $1,986.33, cost.

14

1 − .015 = .985
$1,750 × .985 = $1,723.75

15

$532 × 1.02¼ = $543.97

16

1 + .00⅝ = 1.00⅝
$2,460 ÷ 1.00⅝ = $2,444.72

17

$745.50 ÷ 1.03 = $723.79

18

63 da. = 2.1 mo. = .0105, per cent.
$2,400 × .0105 = $25.20, int. for 63 da.
$2,400 × .00⅝ = $15, exchange.
$2,400 + $15 = $2,415, amount of draft and exchange.
$2,415 − $25.20 = $2,389.80, cost of draft.

19

33 da. = 1.1 mo. = .0055, per cent, or rate of discount.
1 − .0055 = .9945, present worth of 1.
.03 , exchange on 1.
1.0245, cost of 1.
$6,117 ÷ 1.0245 = $5,970.72, face of draft.

20 ***Page 332.***

33 da. = 1.1 mo. = .0055, per cent, or rate of discount.
$1 - .0055 = .9945$, present worth of 1.
$1 - .98\frac{1}{2} = .015$, exchange on 1.
.9795, cost of 1.
$\$1,352.62 \div .9795 = \$1,380.93$, face of draft.

RATIO AND PROPORTION.

Page 334.

1

$45 : 15 = 45 \div 15 = 3$

2

$14 : 112 = 14 \div 112 = \frac{1}{8}$

3

$29 : 8 = 29 \div 8 = 3\frac{5}{8}$

4

12 h. : 16 h. $= 12 \div 16 = \frac{3}{4}$

5

$\$1.25 : \$6.25 = 1.25 \div 6.25 = \frac{1}{5}$

6

$17\frac{1}{2}$ yd. : $2\frac{1}{2}$ yd. $= 17\frac{1}{2} \div 2\frac{1}{2} = 7$

7

3.5 mo. : 24.5 mo. $= 3.5 \div 24.5 = \frac{1}{7}$

8

35 da. : $4\frac{3}{8}$ da. $= 35 \div 4\frac{3}{8} = 8$

9

1.25 gal. (= 1 gal. 1 qt.) : 10 gal. $= 1.25 \div 10 = \frac{1}{8}$

10

$1,275 : 425 = 1,275 \div 425 = 3$

11

$\$300 \div .75 = \$400$

12

66×5 ft. = 330 ft. = 20 rd.

13

$8 \times 3 \times 5 \times 90 = 10,800$
$5 \times 30 = 150$
$10,800 \div 150 = 72$

14

$16 : 24 = 16 \div 24 = \frac{2}{3}$
$28 : 84 = 28 \div 84 = \frac{1}{3}$
$\frac{2}{3}$, the ratio of 16 to 24, is the greater.

15

4 ft. : (3 yd. =) 9 ft. $= 4 \div 9 = \frac{4}{9}$;
96 rd. : (1 mi. =) 320 rd. $= 96 \div 320 = \frac{3}{10}$
$\frac{4}{9}$, the ratio of 4 ft. to 3 yd., is the greater.

16

$12 \times 4 \times 8 = 384$; $36 \times 11 \times 21 = 8,316$
$384 : 8,316 = 384 \div 8,316 = \frac{32}{693}$

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17

$$\left.\begin{array}{r} 5:8 \\ 72:3 \\ 30:5 \end{array}\right\} = 10{,}800 : 120$$

$$\frac{5 \times 72 \times 30}{8 \times 3 \times 5} = \frac{10{,}800}{120} = 90$$

18

$$\left.\begin{array}{r} \frac{1}{21} : \frac{2}{3} \\ \frac{2}{3} : 6 \\ \frac{3}{4} : \frac{21}{64} \end{array}\right\} = \frac{1}{42} : \frac{21}{16}$$

$$\tfrac{1}{21} \times \tfrac{2}{3} \times \tfrac{3}{4} = \tfrac{1}{42};$$

$$\tfrac{2}{3} \times 6 \times \tfrac{21}{64} = \tfrac{21}{16};$$

$$\tfrac{1}{42} : \tfrac{21}{16} = \tfrac{1}{42} \div \tfrac{21}{16} = \tfrac{8}{441}$$

Page 335.

1

$\overline{30 \times 7} \div 6 = 35$

2

$\overline{3 \times 4} \div 1 = 12$

3

$\overline{6 \times 12} \div 8 = 9$

4

$\overline{4 \times 9} \div 3 = 12$

5

$\overline{10 \times 18} \div 5 = 36$

6

$\overline{9 \times 5} \div 3 = 15$

Page 336.

7

$\overline{9 \times 16} \div 12 = 12$

8

$\overline{24 \times 24} \div 18 = 32$

9

$\overline{5 \times 8} \div 9 = 4\tfrac{4}{9}$

10

$\overline{10 \times 14} \div 21 = 6\tfrac{2}{3}$

11

$\overline{21 \times 35} \div 15 = 49$

12

$\overline{40 \times 5.3} \div 8 = 26.5$

13

$\overline{5 \times 27} \div 12.5 = 10.8$

14

$\overline{10\tfrac{1}{5} \times 7} \div 8\tfrac{2}{4} = 8\tfrac{2}{5}$

15

$\overline{\tfrac{7}{12} \times \tfrac{9}{16}} \div \tfrac{3}{16} = 1\tfrac{3}{4}$

16

$\overline{16 \times 3 \text{ qt.}} \div 48 = 1 \text{ qt.}$

17

$\overline{6 \times 10 \text{ lb.}} \div 15 = 4 \text{ lb.}$

18

$\overline{4 \times 12 \text{ oz.}} \div 9 = 5\tfrac{1}{3} \text{ oz.}$

19

$\overline{21 \times 3} \div 9 = 7$

20

$\overline{19 \times 2} \div 12 = 3\tfrac{1}{6}$

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1

57 bu. : 32 bu. : : \$14.25 : \$—

$$\frac{32 \times \$14\tfrac{1}{4}}{57} = \$8$$

2

12¾ lb. : 9½ lb. : : \$1.78½ : \$—

$$\frac{9.5 \times \$1.785}{12.75} = \$1.33$$

Page 337.

3

6 yd. : 11 yd. : : \$30.75 : \$—

$$\frac{11 \times \$30.75}{6} = \$56.37\tfrac{1}{2}$$

4

23 lb. : 196 lb. : : \$1.15 : \$—

$$\frac{196 \times \$1.15}{23} = \$9.80$$

5

11.1 rm. : 27.3 rm. :: $\$13.87\tfrac{1}{2}$: \$—

$$\frac{27.3 \times \$13.875}{11.1} = \$34.12\tfrac{1}{2}$$

6

15.75 cd. : $9\tfrac{3}{8}$ cd. : : \$94.50 : \$—

$$\frac{9\tfrac{3}{8} \times \$94.50}{15.75} = \$56.25$$

7

60 lb. : 700 lb. : : \$1.15 : \$—

$$\frac{700 \times \$1.15}{60} = \$13.42$$

8

2.9 T. : 3.25 T. : : \$24.65 : \$—

$$\frac{3.25 \times \$24.65}{2.9} = \$27.62\tfrac{1}{2}$$

9

$53\tfrac{3}{4}$ gal. : $44\tfrac{1}{2}$ gal. : : \$2.68 : \$—

$$\frac{44\tfrac{1}{2} \times \$2.68}{53\tfrac{3}{4}} = \$2.22$$

11

209 lb. : 645 lb. : : 475 yd. : — yd.

$$\frac{645 \times 475 \text{ yd.}}{209} = 1{,}465\tfrac{10}{11} \text{ yd.}$$

10

3 mi. 60 rd. 12 ft. = 16,842 ft.
25 " 15 " 12 " = $132{,}259\tfrac{1}{2}$ "

16,842 ft. : $132{,}259\tfrac{1}{2}$ ft. : : 802 revolutions : — revolutions

$$\frac{132{,}259\tfrac{1}{2} \times 802 \text{ revolutions}}{16{,}842} = 6{,}298\tfrac{1}{14} \text{ revolutions}$$

Page 338.

12

$10\tfrac{1}{4}$ da. : $5\tfrac{3}{8}$ da. :: 2,337 mi. : — mi.

$$\frac{5\tfrac{3}{8} \times 2{,}337 \text{ mi.}}{10\tfrac{1}{4}} = 1{,}225\tfrac{1}{2} \text{ mi.}$$

13

$4\tfrac{13}{30}$ mo. : $5\tfrac{3}{5}$ mo. : : \$139.59 : \$—

$$\frac{5\tfrac{3}{5} \times \$139.59}{4\tfrac{13}{30}} = \$176.32$$

14

$56\tfrac{1}{4}$ ft. : 119 ft. : : 45 ft. : — ft.

$$\frac{119 \times 45 \text{ ft.}}{56\tfrac{1}{4}} = 95.2 \text{ ft.}$$

15

18 lb. : 75 lb. : : 16 lb. : — lb.

$$\frac{75 \times 16 \text{ lb.}}{18} = 66\tfrac{2}{3} \text{ lb.}$$

16

$5\tfrac{3}{5}$ lb. : 10.5 lb. : : $21\tfrac{1}{4}$ qt. : — qt.

$$\frac{10\tfrac{1}{2} \times 21\tfrac{1}{4} \text{ qt.}}{5\tfrac{3}{5}} = 39\tfrac{5}{6} \text{ qt.}$$

17

$\tfrac{7}{8}$ A. : $\tfrac{3}{4}$ A. : : \$187.50 : \$—

$$\frac{\tfrac{3}{4} \times \$187.50}{\tfrac{7}{8}} = \$160.71$$

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18

$\$18,900 : \$2,250 :: \$8,344 : \$—$

$$\frac{2,250 \times \$8,344}{18,900} = \$993\tfrac{1}{3}$$

19

$\tfrac{5}{8}$ bar. : $\tfrac{7}{8}$ bar. :: $1 : $—

$$\frac{\tfrac{7}{8} \times \$1}{\tfrac{5}{8}} = \$1.40$$

20

450.56 bu. : 1,663$\tfrac{3}{4}$ bu. :: 5$\tfrac{1}{2}$ cd. : — cd.

$$\frac{1,663.75 \times 5.5 \text{ cd.}}{450.56} = 20.309 + \text{ cd.}$$

21

27 yd. : 16 × 42$\tfrac{1}{2}$ yd. :: $36.45 : $—

$$\frac{16 \times 42\tfrac{1}{2} \times \$36.45}{27} = \$918$$

22

$450 : $675 :: 8 mo. : — mo.

$$\frac{675 \times 8 \text{ mo.}}{450} = 12 \text{ mo.} = 1 \text{ yr.}$$

23

8$\tfrac{1}{2}$ T. : 4 T. :: $46.75 : $—

$$\frac{4 \times \$46.75}{8\tfrac{1}{2}} = \$22$$

24

$\tfrac{7}{9}$ yd. : 16$\tfrac{1}{2}$ yd. :: $$\tfrac{7}{8}$: $—

$$\frac{16\tfrac{1}{2} \times \$\tfrac{7}{8}}{\tfrac{7}{9}} = \$18.56\tfrac{1}{4}$$

25

$\tfrac{1}{6}$ h. : 9$\tfrac{5}{7}$ h. :: 9$\tfrac{3}{5}$ mi. : — mi.

$$\frac{9\tfrac{5}{7} \times 9\tfrac{3}{5} \text{ mi.}}{\tfrac{1}{6}} = 559\tfrac{19}{35} \text{ mi.}$$

26

3 men : 8 men :: 5 da. : — da.

$$\frac{8 \times 5 \text{ da.}}{3} = 13\tfrac{1}{3} \text{ da.}$$

27

300 sheep : 850 sheep :: 150$\tfrac{39}{40}$ A. : — A.

$$\frac{850 \times 150\tfrac{39}{40} \text{ A.}}{300} = 427 \text{ A. } 122 \text{ sq. rd.}$$

28

156 knives : 57 knives :: $168 : $—

$$\frac{57 \times \$168}{156} = \$61.38$$

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1

$$\frac{12 \times 18 \times 3}{4 \times 9} = 18$$

2

$$\frac{3 \times 4 \times 5 \times 54}{12 \times 3 \times 4} = 22\tfrac{1}{2}$$

3

$$\frac{.06 \times 8 \times 15 \text{ oz.}}{10 \times 6} = \tfrac{3}{25} \text{ oz.}$$

4

$$\frac{40 \times 7 \times 6\tfrac{1}{4}}{8 \times 105} = 2\tfrac{1}{12}$$

5

$$\frac{21 \times 1.6 \times .2 \times 8\tfrac{3}{4}}{48 \times 1.5 \times 2\tfrac{1}{10}} = \tfrac{7}{18}$$

6

$$\frac{3 \times 25 \times 28 \times 20}{12 \times 4 \times 5} = 175$$

Page 340.

1

$$\left.\begin{array}{r}13\frac{1}{2}\text{ ft. wide} : 15\frac{3}{4}\text{ ft. wide}\\ 18\text{ ft. long} : 16\frac{1}{2}\text{ ft. long}\end{array}\right\} :: \$12.16 : \$—$$

$$\frac{15\frac{3}{4} \times 16\frac{1}{2} \times \$12.16}{13\frac{1}{2} \times 18} = \$13$$

2

$$\left.\begin{array}{r}27\text{ da.} : 63\text{ da.}\\ 10\text{ h.} : 12\frac{1}{2}\text{ h.}\end{array}\right\} :: 3{,}060\text{ pumps} : —\text{ pumps.}$$

$$\frac{63 \times 12\frac{1}{2} \times 3{,}060\text{ pumps}}{27 \times 10} = 8{,}925\text{ pumps.}$$

3

$$\left.\begin{array}{r}3\frac{5}{8}\text{ rd. front} : 3\frac{1}{2}\text{ rd. front}\\ 11\text{ rd. deep} : 13\frac{2}{7}\text{ rd. deep}\end{array}\right\} :: \$675 : \$—$$

$$\frac{3\frac{1}{2} \times 13\frac{2}{7} \times \$675}{3\frac{5}{8} \times 11} = \$787.15$$

4

$$\left.\begin{array}{r}1{,}225\text{ ft. long} : 1{,}607\text{ ft. long}\\ 12\text{ ft. wide} : 16\text{ ft. wide}\\ 4\text{ ft. high} : 5\text{ ft. high}\\ 8\text{ teams} : 10\text{ teams}\end{array}\right\} :: 21\text{ da.} : —\text{ da.}$$

$$\frac{1{,}607 \times 16 \times 5 \times 10 \times 21\text{ da.}}{1{,}225 \times 12 \times 4 \times 8} = 57\frac{11}{28}\text{ da.}$$

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5

$$\left.\begin{array}{r}\$93.87 : \$13.02\\ 18.6\text{ mo.} : 44.7\text{ mo.}\end{array}\right\} :: \$360 : \$—$$

$$\frac{13.02 \times 44.7 \times \$360}{93.87 \times 18.6} = \$120$$

6

$$\left.\begin{array}{r}1{,}760\text{ yd.} : 2{,}730\text{ yd.}\\ 11\text{ ft.} : 8\text{ ft.}\\ 10\text{ in.} : 8\text{ in.}\end{array}\right\} :: 480\text{ boards} : —\text{ boards.}$$

$$\frac{2{,}730 \times 8 \times 8 \times 480\text{ boards}}{1{,}760 \times 11 \times 10} = 433\frac{23}{121}\text{ boards.}$$

Hence, 434 boards will be required.

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7

$$\left.\begin{array}{r@{\ :\ }l}\text{5 men} & \text{3 men}\\ \text{6 da.} & \text{4 da.}\end{array}\right\} :: \text{150 pr.} : \text{— pr.}$$

$$\frac{3 \times 4 \times 150 \text{ pr.}}{5 \times 6} = 60 \text{ pr.}$$

8

$$\left.\begin{array}{r@{\ :\ }l}\$800 \text{ investment} & \$356 \text{ investment}\\ \text{15 mo.} & \text{8 mo.}\end{array}\right\} :: \$70 \text{ gain} : \$\text{—}$$

$$\frac{356 \times 8 \times \$70}{800 \times 15} = \$16.61 \text{ gain.}$$

9

$$\left.\begin{array}{r@{\ :\ }l}1\tfrac{1}{4} \text{ in. thick} & 1\tfrac{1}{2} \text{ in. thick}\\ \text{1, length} & 2\tfrac{1}{4}\text{, length}\\ \text{1, width} & 1\tfrac{1}{2}\text{, width}\end{array}\right\} :: \text{2,100 ft.} : \text{— ft.}$$

$$\frac{1.5 \times 2.25 \times 1.5 \times 2{,}100 \text{ ft.}}{1.25 \times 1 \times 1} = 8{,}505 \text{ ft.}$$

10

$$264 \text{ mi.} : \left\{\begin{array}{l}\text{36 mi.}\\ \text{60 mi.}\\ \text{72 mi.}\\ \text{96 mi.}\end{array}\right\} :: \$9.24 : \left\{\begin{array}{l}\$\text{—}\\ \$\text{—}\\ \$\text{—}\\ \$\text{—}\end{array}\right. \quad \begin{array}{l}\dfrac{36 \times \$9.24}{264} = \$1.26;\\ \dfrac{60 \times \$9.24}{264} = \$2.10;\\ \dfrac{72 \times \$9.24}{264} = \$2.52;\\ \dfrac{96 \times \$9.24}{264} = \$3.36.\end{array}$$

11

$$\left.\begin{array}{r@{\ :\ }l}\text{24 ft. long} & 10\tfrac{1}{2} \text{ ft. long}\\ 4\tfrac{1}{2} \text{ ft. wide} & \text{6 ft. wide}\\ 4\tfrac{2}{3} \text{ ft. deep} & \text{5 ft. deep}\end{array}\right\} :: \text{405 bu.} : \text{— bu.}$$

$$\frac{10\tfrac{1}{2} \times 6 \times 5 \times 405 \text{ bu.}}{24 \times 4\tfrac{1}{2} \times 4\tfrac{2}{3}} = 253\tfrac{1}{8} \text{ bu.}$$

12

$$\left.\begin{array}{r@{\ :\ }l}\text{3 men} & \text{2 men}\\ \text{6 da.} & \text{5 da.}\end{array}\right\} :: \text{453 bu.} : \text{— bu.} \qquad \frac{2 \times 5 \times 453 \text{ bu.}}{3 \times 6} = 251\tfrac{2}{3} \text{ bu.}$$

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13

$$\left.\begin{array}{r@{\ :\ }l} \text{5 men} & \text{3 men} \\ \text{240 ft. long} & \text{180 ft. long} \\ \text{6 ft. wide} & \text{4 ft. wide} \end{array}\right\} :: \text{15 da.} : \text{— da.}$$

$$\frac{3 \times 180 \times 4 \times 15 \text{ da.}}{5 \times 240 \times 6} = 4\tfrac{1}{2} \text{ da.}$$

14

$$\left.\begin{array}{r@{\ :\ }l} \text{244 ft. long} & \text{8 ft. long} \\ \text{5 ft. high} & \text{4 ft. high} \end{array}\right\} :: \$152.50 : \$\text{—} \qquad \frac{8 \times 4 \times \$152.50}{244 \times 5} = \$4$$

15

$$\left.\begin{array}{r@{\ :\ }l} 11\tfrac{1}{4}\text{ h.} & \text{9 h.} \\ \text{12 bricklayers} & \text{9 bricklayers} \\ \text{96 ft. long} & \text{126 ft. long} \\ \text{21 ft. high} & \text{28 ft. high} \\ 1\tfrac{1}{4}\text{ ft. thick} & 1\tfrac{1}{2}\text{ ft. thick} \end{array}\right\} :: \text{16 da.} : \text{— da.}$$

$$\frac{9 \times 9 \times 126 \times 28 \times 1.5 \times 16 \text{ da.}}{11.25 \times 12 \times 96 \times 21 \times 1.25} = 20\tfrac{4}{25} \text{ da.}$$

POWERS AND ROOTS.

Square Root.

Page 347.

1

29'16	54
25	
416	104
416	

2

58'21'69	763
49	
921	146
876	
4569	1523
4569	

3

29'73'52'09	5,453
25	
473	104
416	
5752	1085
5425	
32709	10903
32709	

4

.07'84	.28
4	
384	48
384	

5

.18'66'24	.432
16	
266	83
249	
1724	862
1724	

7

56'.25	7.5
49	
725	145
725	

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6

$$\sqrt{\frac{729}{784}}=\frac{\sqrt{729}}{\sqrt{784}}$$

7′29	27, numerator.
4	
329	47
329	

7′84	28, denominator.
4	
384	48
384	

Hence, $\sqrt{\frac{729}{784}}=\frac{27}{28}$

8

36′85′.58′26′81	60.709
36	
8558	1207
8449	
1092681	121409
1092681	

10

$$\sqrt{\frac{324}{961}}=\frac{\sqrt{324}}{\sqrt{961}}$$

3′24	18, numerator.
1	
224	28
224	

9′61	31, denominator.
9	
61	61
61	

Hence, $\sqrt{\frac{324}{961}}=\frac{18}{31}$

9

.00′02′89	.017
1	
189	27
189	

11

$$\sqrt{1,423\tfrac{1178}{2401}}=\sqrt{\tfrac{3418801}{2401}}$$

3′41′88′01	1,849, numerator.
1	
241	28
224	
1788	364
1456	
33201	3689
33201	

24′01	49, denominator.
16	
801	89
801	

$\frac{1849}{49}=37\frac{36}{49}$

Hence, $\sqrt{1,423\frac{1178}{2401}}=37\frac{36}{49}$

12

8	2.8284 +
4	
400	48
384	
1600	562
1124	
47600	5648
45184	
241600	56564
226256	
15344	

Page 347.

13

78	8.83176 +
64	
1400	168
1344	
5600	1763
5289	
31100	17661
17661	
1343900	176627
1236389	
10751100	1766346
10598076	
153024	

14

93'12'.25	96.5
81	
1212	186
1116	
9625	1925
9625	

Hence, 96.5 ft., length of 1 side.

15

12,488$\frac{1}{16}$ sq. yd. =
12,488.0625 sq. yd.

1'24'88'.06'25	111.75
1	
24	21
21	
388	221
221	
16706	2227
15589	
111725	22345
111725	

Hence, 111.75 yd.

16

$$\frac{522\frac{2}{3}\text{ sq. in.}}{6} = 87\tfrac{1}{9}\text{ sq. in.,}$$
area of each side.

$$\sqrt{87\tfrac{1}{9}} = \sqrt{\tfrac{784}{9}}$$

$$\sqrt{\frac{784}{9}} = \frac{\sqrt{784}}{\sqrt{9}} = \frac{28}{3} = 9\tfrac{1}{3}$$

Hence, each side is 9$\frac{1}{3}$ in. square.

17

$\frac{2}{7}$ of 32,256 sq. ft. = 9,216 sq. ft.

92'16	96
81	
1116	186
1116	

96 ft. ÷ $\frac{2}{7}$ = 336 ft., length.

Hence, 96 ft. wide and 336 ft. long.

18

21$\frac{1}{40}$ A. = 3,364 sq. rd. in area.

$\sqrt{3364} = 58$

Hence, 58 rd. long.

19

$$\frac{12.1\text{ A.}}{4} = 484\text{ sq. rd.}$$

$\sqrt{484} = 22$

Hence, 22 rd. wide,
and 4 × 22 rd. = 88 rd. long.

CUBE ROOT.

Page 351.

1

148'877	53
125	
23877	7959
23877	

2

39'304	34
27	
12304	3076
12304	

3

.006'859	.19
1	
5859	651
5859	

4

.658'503	.87
512	
146503	20929
146503	

5

.000'512	.08
512	

6

300'.763	6.7
216	
84763	12109
84763	

7

178'.453'547	5.63
125	
53453	8436
50616	
2837547	945849
2837547	

8

128'.024'064	5.04
125	
3024064	756016
3024064	

9

119'095'.488	49.2
64	
55095	5961
53649	
1446488	723244
1446488	

10

$$\sqrt[3]{\frac{216}{5832}}=\frac{\sqrt[3]{216}}{\sqrt[3]{5832}}=\frac{6}{18}=\frac{1}{3}$$

11

$$10\tfrac{1915}{4096}=\tfrac{42875}{4096}$$

42'875	35, { numerator.	4'096	16,, { denominator.
27		1	
15875	3175	3096	516
15875		3096	

Hence, $\sqrt[3]{10\tfrac{1915}{4096}}=\tfrac{35}{16}=2\tfrac{3}{16}$

12

$$5\tfrac{84}{169}=5'.497041420118343+$$

5'.497'041'420'118'343+	1.76485 +
1	
4497	559
3913	
584041	89796
538776	
45265420	9313936
37255744	
8009676118	933940224
7471521792	
538154326343	93438268425
467191342125	
70962984218	

13

314'432	68
216	
98432	12304
98432	

6 cu. yd. 19 cu. ft. 1,664 cu. in. = 314,432 cu. in.

The cistern is a cube, and each dimension is 68 in. or 5 ft. 8 in.

14

118'805'247'296	4,916, required factor.
64	
54805	5961
53649	
1156247	721771
721771	
434476296	72412716
434476296	

16

1 bu. = 2150.42 cu. in.

2'150'.420	12.9 +
1	
1150	364
728	
422420	46521
418689	
3731	

Hence, 12.9 + in. cube.

15

Since the length of the wall is (2 × 16 =) 32 times the thickness, and the height is 2 times the thickness, the wall may be divided into (2 × 16 × 2 =) 64 equal cubes, one dimension of each of which equals the thickness of the wall.

$$216 \text{ cu. ft.} \div 64 = 3\tfrac{3}{8} \text{ cu. ft.} = 5,832 \text{ cu. in.}$$

$$\sqrt[3]{5,832} = 18$$

Hence, the wall is 18 in. = 1 ft. 6 in. thick, 2 × 1 ft. 6 in. = 3 ft. high, and 16 × 3 ft. = 48 ft. long.

17

1 gal. = 231 cu. in.

231	6.135 +
216	
15000	10981
10981	
4019000	1121799
3365397	
653703000	112822675
564113375	
89589625	

Hence, 6.135 + in. cube.

18

12 × 7 × 4 cu. ft. = 336 cu. ft.
336 cu. ft. = 580,608 cu. in., contents.

580'608	83.42 +
512	
68608	19929
59787	
8821000	2076741
8306964	
514036000	208716849
417433698	
96602302	

Hence, 83.42 + in. = 6 ft. 11.42 + in.

Page 351. **19**

78 × 65 × 52 cu. in. = 263,640 cu. in., contents.

263'640	64.12 +
216	
47640	11536
46144	
1496000	1230721
1230721	
265279000	123302764
246605528	
18673472	

Hence, each dimension is 64.12 + in.

MEASUREMENTS.

Page 352. **1**

$\sqrt{\overline{116\frac{1}{6}}^2 + \overline{87\frac{3}{4}}^2} = \sqrt{21,194\frac{109}{144}} = 145.584 + = 145$ ft. 7+ in.

2

19 × $10\frac{1}{2}$ in. = $199\frac{1}{2}$ in., base.

19 × $7\frac{1}{4}$ in. = $137\frac{3}{4}$ in., perpendicular.

$\sqrt{199.5^2 + 137.75^2} = 242.43 +$

Hence, 242.43 + in. = 20 ft. 2.43 + in., length of hand-rail.

3

$\frac{30}{2}$ ft. = 15 ft., $\frac{1}{2}$ of length of roof.

$\frac{24}{2}$ ft. = 12 ft., $\frac{1}{2}$ " width " "

$\sqrt{15^2 + 12^2}$ = the No. of ft. in the horizontal distance from corner of roof to point under the peak.

$\sqrt{\sqrt{369^2} + 9^2} = \sqrt{450} = 21.213 +$; hence, 21.213 + ft., required distance.

Or

$\sqrt{15^2 + 12^2 + 9^2} = \sqrt{450} = 21.213 +$; hence, 21.213 + ft., required distance.

4

$\sqrt{39^2 + 36^2} = \sqrt{225} = 15$; hence, 15 ft.

5 ***Page 353.***

$\sqrt{72^2 + 82^2} = \sqrt{11,908} = 109.123 +$; hence, 109.123 + ft.

6

$88^2 = 7,744$, sum of squares of the two legs.

$\frac{7,744}{2} = 3,872$, square of 1 leg.

$\sqrt{3,872} = 62.225+ = 62.225+$ ft.; hence, the street is 62 ft. 2.7+ in. wide.

7

The diagonal of a cube equals the square root of the sum of the squares of the three equal dimensions, or of 3 times the square of its edge.

$\sqrt{\frac{43.3^2}{3}} = \sqrt{624.96\frac{1}{3}} = 24.99 +$; hence, the side is 25 in., nearly.

8

26.4 ft. $\div$ 2 = 13.2 ft., ½ the distance between the eaves.

$\sqrt{16.5^2 - 13.2^2} = \sqrt{98.01} = 9.9$; hence, 9.9 ft.

9

$\sqrt{30^2 + 40^2} = 50 \qquad \sqrt{30^2 + 72^2} = 78 \qquad \sqrt{30^2 + 133\frac{1}{3}^2} = 136.66 +$

Hence, the lengths of the rods are 50 ft., 78 ft., and 136 ft. 8 in., nearly.

10

The diameter of the log is the diagonal of the end of the square stick of timber.

$\sqrt{\frac{22^2}{2}} = \sqrt{242} = 15.55 +$; hence, 15.55 + in. square.

1 ***Page 355.***

4 × 8 in. = 32 in., width of 4 sides;
1 ft. 9 in. = 21 in., length " 4 "
32 × 21 sq. in. = 672 sq. in., area of 4 sides;
2 × 8 × 8 sq. in. = 128 " " " " 2 ends;
800 " " = $5\frac{5}{9}$ sq. ft., area of prism.

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2

10 in. + 10 in. + 7 in. + 7 in. = 34 in. = $2\frac{5}{6}$ ft.

50 × $2\frac{5}{6}$ sq. ft. = $141\frac{2}{3}$ sq. ft.

2 × 10 × 7 sq. in. = 140 sq. in. = $\frac{35}{36}$ “ “

$142\frac{23}{36}$ “ “ = 142 sq. ft. 92 sq. in.

3

$3\frac{1}{7}$ × 18 in. = $56\frac{4}{7}$ in. = $4\frac{5}{7}$ ft., circumference.

20 × $4\frac{5}{7}$ sq. ft. = $94\frac{2}{7}$ sq. ft. = 94 sq. ft. $41\frac{1}{7}$ sq. in., curved surface.

4

$3\frac{1}{7}$ × 8 ft. = $25\frac{1}{7}$ ft., circumference.

4 ft., $\frac{1}{2}$ diameter; $12\frac{4}{7}$ ft., $\frac{1}{2}$ circumference.

6 × $25\frac{1}{7}$ sq. ft. = $150\frac{6}{7}$ sq. ft. in surface of sides.

4 × $12\frac{4}{7}$ sq. ft. = $50\frac{2}{7}$ “ “ “ bottom of tank.

$201\frac{1}{7}$ “ “ = 201 sq. ft. $20\frac{4}{7}$ sq. in., outer surface.

5

$3\frac{1}{7}$ × 100 in. = $314\frac{2}{7}$ in., circumference of base.

$\frac{1}{2}$ of 8 ft. 4 in. = 50 in., radius of base.

72 ft. 6 in. = 870 in., height.

$\sqrt{50^2+870^2} = \sqrt{759{,}400}$ = 871.435+ = 871.435+ in., slant height.

$$\frac{314\frac{2}{7} \times 871.435+ \text{ sq. in.}}{2} = 136{,}939.785+ \text{ sq. in.} =$$

105 sq. yd. 5 sq. ft. 139 + sq. in.

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6

$$\frac{8 \times 6 \times 33 \text{ sq. ft.}}{2} = 792 \text{ sq. ft.} = 88 \text{ sq. yd.}$$

7

3 ft. = 36 in.

6 × $9\frac{1}{8}$ × 36 sq. in. = 1,971 sq. in. = 13 sq. ft. 99 sq. in.

8

28 ft. = 336 in.

$3\frac{1}{7}$ × 17 in. = $53\frac{3}{7}$ in., circumference.

336 × $53\frac{3}{7}$ sq. in. = 17,952 sq. in. = $124\frac{2}{3}$ sq. ft.

9 ***Page 356.***

$$\frac{8 \times 5 \times 37\tfrac{1}{3} \text{ sq. ft.}}{2} = 746\tfrac{2}{3} \text{ sq. ft.} = 82 \text{ sq. yd. } 8\tfrac{2}{3} \text{ sq. ft.}$$

10

40 in. ÷ $3\frac{1}{7}$ = $12\frac{8}{11}$ in., diameter of base.
$6\frac{4}{11}$ in. = radius; and 20 in. = $\frac{1}{2}$ circumference of base.
$6\frac{4}{11}$ × 20 sq. in. = $127\frac{3}{11}$ sq. in., area of base.
36 × 20 " " = 720 " " " " lateral surface.
Entire area, $847\frac{3}{11}$ " " = 5 sq. ft. $127\frac{3}{11}$ sq. in.

11

15 in. = $\frac{1}{2}$ of slant height; $5\frac{7}{10}$ in. = $\frac{1}{2}$ of diameter of base.
$3\frac{1}{7}$ × $11\frac{2}{5}$ in. = $\frac{1254}{35}$ in., circumference of base.
$\frac{57}{10}$ × $\frac{1254}{35}$ sq. in. = $102\frac{7}{50}$ sq. in., area of base.
15 × $\frac{1254}{35}$ " " = $537\frac{3}{7}$ " " " " lateral surface.
Entire area, $639\frac{199}{350}$ " " = 4 sq. ft. 63.54 + sq. in.

12

$$\frac{4 \times 11 \times 27 \text{ sq. in.}}{2} = 594 \text{ sq. in., area of the four sides.}$$

11 × 11 sq. in. = 121 " " " " base.
Entire area, 715 " " = 4 sq. ft. 139 sq. in.

1 ***Page 357.***

2 ft. 3 in. = 27 in., diameter; 16 ft. 9 in. = 201 in., height.
$3\frac{1}{7}$ × 27 sq. in. = $84\frac{6}{7}$ sq. in., circumference.
$13\frac{1}{2}$ sq. in. = $\frac{1}{2}$ diameter; $42\frac{3}{7}$ sq. in. = $\frac{1}{2}$ circumference.
$13\frac{1}{2}$ × $42\frac{3}{7}$ sq. in. = $572\frac{11}{14}$ sq. in., area of base.
201 × $572\frac{11}{14}$ cu. in. = 115,129$\frac{13}{14}$ cu. in., volume.
115,129$\frac{13}{14}$ cu. in. = 66 cu. ft. 1,081$\frac{13}{14}$ cu. in.

2

$$\frac{18 \times 18 \text{ sq. in.}}{2} = 162 \text{ sq. in.} = 1\tfrac{1}{8} \text{ sq. ft., area of base.}$$

24 × $1\frac{1}{8}$ cu. ft. = 27 cu. ft., cubic contents.

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3

8 ft. = 96 in., length; 4 in., diameter; and 2 in., $\frac{1}{2}$ diameter.

$3\frac{1}{7} \times 4$ in. = $12\frac{4}{7}$ in., circumference; and $6\frac{2}{7}$ in., $\frac{1}{2}$ circumference.

$2 \times 6\frac{2}{7}$ sq. in. = $12\frac{4}{7}$ sq. in., area of base.

$96 \times 12\frac{4}{7}$ cu. in. = $1,206\frac{6}{7}$ cu. in., capacity.

4

$3\frac{1}{7} \times 5$ ft. = $15\frac{5}{7}$ ft., circumference.

$2\frac{1}{2}$ ft. = $\frac{1}{2}$ diameter; $7\frac{6}{7}$ ft. = $\frac{1}{2}$ circumference.

$2\frac{1}{2} \times 7\frac{6}{7}$ sq. ft. = $19\frac{9}{14}$ sq. ft., area of base.

$6 \times 19\frac{9}{14}$ cu. ft. = $117\frac{6}{7}$ cu. ft. = 881.632 + gal., capacity.

5

29 ft. = 348 in., length; and 9 in., diameter.

$3\frac{1}{7} \times 9$ in. = $26\frac{2}{7}$ in., circumference.

$4\frac{1}{2}$ in. = $\frac{1}{2}$ diameter; $13\frac{8}{7}$ in. = $\frac{1}{2}$ circumference.

$4\frac{1}{2} \times 13\frac{8}{7}$ sq. in. = $63\frac{9}{14}$ sq. in., area of base.

$348 \times 63\frac{9}{14}$ cu. in. = $22,147\frac{5}{7}$ cu. in. = 12 cu. ft. $1,411\frac{5}{7}$ cu. in., cubical contents.

6

$\frac{1}{40}$ in., diameter; and $\frac{22}{7} \times \frac{1}{40}$ in. = $\frac{11}{140}$ in., circumference.

$\frac{1}{80}$ in. = $\frac{1}{2}$ diameter; $\frac{11}{280}$ in. = $\frac{1}{2}$ circumference.

$\frac{1}{80} \times \frac{11}{280}$ sq. in. = $\frac{11}{22400}$ sq. in., area of base, or of end of wire.

$\frac{11}{22400}$ cu. in. = volume of 1 in. of wire.

1,728 cu. in. $\div \frac{11}{22400}$ = $3,518,836\frac{4}{11}$ in. of wire = 55 mi. $945\frac{5}{11}$ yd.

7

30×30 sq. ft. = 900 sq. ft.

$3\frac{1}{3} \times 900$ cu. ft. = 3,000 cu. ft., volume, = 3,000 T. at 1 cu. ft. to 1 T.

3,000 T. $\div$ 550 = $5\frac{5}{11}$ T.

8

The radius of the base is $6\frac{4}{11}$ in., and the area of the base is $127\frac{3}{11}$ sq. in. (see p. 175, prob. 10).

$$\sqrt{36^2 - \overline{6\tfrac{4}{11}}^2} = \sqrt{1,255\tfrac{51}{121}} = 35.43 + = 35.43 + \text{ in., height.}$$

$$\frac{35.43+}{3} \times 127\tfrac{3}{11} \text{ cu. in.} = 1,503.09\tfrac{1}{11} + \text{ cu. in., volume.}$$

9 ***Page 357.***

$\sqrt{27^2 - \overline{5\frac{1}{2}}^2} = \sqrt{698\frac{3}{4}} = 26.433 + = 26.433 +$ in., altitude.

11 × 11 sq. in. = 121 sq. in., area of base.

$\frac{26.433+}{3}$ × 121 cu. in. = 1,066.13 + cu. in., volume.

10

$3\frac{1}{7}$ × 19 ft. = $59\frac{5}{7}$ ft., circumference.
$9\frac{1}{2}$ ft. = $\frac{1}{2}$ diameter; $29\frac{6}{7}$ ft. = $\frac{1}{2}$ circumference.
$9\frac{1}{2}$ × $29\frac{6}{7}$ sq. ft. = $283\frac{9}{14}$ sq. ft., area of base.
17 × $283\frac{9}{14}$ cu. ft. = 4,821.9285+ cu. ft., vol. of cylinder.
17 ft. ÷ 3 = $5\frac{2}{3}$ ft., = $\frac{1}{3}$ of altitude.
$5\frac{2}{3}$ × $283\frac{9}{14}$ cu. ft. = 1,607.3095+ " " " " cone.
Entire volume, 6,429.238+ " " = 23 T. 1,624 lb.

11

$6\frac{1}{4}$ ft. = 75 in., diameter; $37\frac{1}{2}$ in., $\frac{1}{2}$ diameter.
$3\frac{1}{7}$ × 75 in. = $235\frac{5}{7}$ in., circumference; 117 in., $\frac{1}{2}$ circumference.
$37\frac{1}{2}$ × $117\frac{6}{7}$ sq. in. = $4,419\frac{9}{14}$ sq. in., area of bottom.
8 ft. = 96 in., depth.
96 × $4,419\frac{9}{14}$ cu. in. = $424,285\frac{5}{7}$ cu. in. = 1,836.734+ gal. =
58 bar. 9.734 + gal.

12

9 × 10 × 12 cu. ft. = 1,080 cu. ft. = 1,866,240 cu. in.
1,866,240 cu. in. = 8,078.95 gal. = 256 bar. 14.96 + gal.

1 ***Page 358.***

$3\frac{1}{7}$ × 15 in. = $47\frac{1}{7}$ in., circumference.
$7\frac{1}{2}$ in. = $\frac{1}{2}$ diameter; $23\frac{4}{7}$ in. = $\frac{1}{2}$ circumference.
$7\frac{1}{2}$ × $23\frac{4}{7}$ sq. in. = $176\frac{11}{14}$ sq. in., area of circle.
4 × $176\frac{11}{14}$ sq. in. = $707\frac{1}{7}$ sq. in. = 4 sq. ft. $137\frac{1}{7}$ sq. in., area of sphere.
15 × $176\frac{11}{14}$ cu. in. = $2,651\frac{11}{14}$ cu. in., volume of cylinder.
$\frac{2}{3}$ of $2,651\frac{11}{14}$ cu. in. = $1,767\frac{6}{7}$ cu. in. = 1 cu. ft. $39\frac{6}{7}$ cu. in.,
volume of globe.

2

$3\frac{1}{7}$ × 2 in. = $6\frac{2}{7}$ in., circumference.
1 in. = $\frac{1}{2}$ diameter; $3\frac{1}{7}$ in. = $\frac{1}{2}$ circumference.
$3\frac{1}{7}$ × 1 sq. in. = $3\frac{1}{7}$ sq. in., area of base of cylinder.
4 × $3\frac{1}{7}$ sq. in. = $12\frac{4}{7}$ sq. in., " " globe.

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3

$3\frac{1}{7} \times 10$ in. $= 31\frac{3}{7}$ in., circumference.
5 in. $= \frac{1}{2}$ diameter; $15\frac{5}{7}$ in. $= \frac{1}{2}$ circumference.
$5 \times 15\frac{5}{7}$ sq. in. $= 78\frac{4}{7}$ sq. in., area of base of cylinder.
$10 \times 78\frac{4}{7}$ cu. in. $= 785\frac{5}{7}$ cu. in., volume of cylinder.
$\frac{2}{3}$ of $785\frac{5}{7}$ cu. in. $= 523.8 +$ cu. in., volume of sphere.

4

The area of a hemisphere equals the area of the circular plane + 2 times that area; *i.e.*, 3 times the area of a circle of the same diameter as the plane surface of the hemisphere.

$3\frac{1}{7} \times 12$ in. $= 37\frac{5}{7}$ in., circumference.
6 in. $= \frac{1}{2}$ diameter; and $18\frac{6}{7}$ in. $= \frac{1}{2}$ circumference.
$6 \times 18\frac{6}{7}$ sq. in. $= 113\frac{1}{7}$ sq. in., area of base of cylinder.
$3 \times 113\frac{1}{7}$ sq. in. $= 339\frac{3}{7}$ sq. in. $= 2$ sq. ft. $51\frac{3}{7}$ sq. in., area of hemisphere.

5

$3\frac{16}{113} \times 7{,}911$ mi. $= 24{,}853\frac{16}{113}$ mi., circumference.
$3{,}955\frac{1}{2}$ mi. $= \frac{1}{2}$ diameter; $12{,}426\frac{129}{226}$ mi. $= \frac{1}{2}$ circumference.
$12{,}426\frac{129}{226} \times 3{,}955\frac{1}{2}$ sq. mi. $= 49{,}153{,}300\frac{355}{452}$ sq. mi., area of base.
$7{,}911 \times 49{,}153{,}300\frac{355}{452}$ cu. mi. $= 388{,}851{,}762{,}513\frac{129}{452}$ cu. mi.,
volume of cylinder.
$\frac{2}{3}$ of $388{,}851{,}762{,}513\frac{129}{452}$ cu. mi. $= 259{,}234{,}508{,}342\frac{43}{226}$ cu. mi.,
volume of earth.

6

$3\frac{1}{7} \times 10$ in. $= 31\frac{3}{7}$ in., circumference.
5 in. $= \frac{1}{2}$ diameter; $15\frac{5}{7}$ in. $= \frac{1}{2}$ circumference.
$5 \times 15\frac{5}{7}$ sq. in. $= 78\frac{4}{7}$ sq. in., area of base of cylinder.
$4 \times 78\frac{4}{7}$ “ “ $= 314\frac{2}{7}$ “ “ “ “ globe.
$\frac{2}{3} \times 10 \times 78\frac{4}{7}$ cu. in. $= 523\frac{17}{21}$ cu. in., volume.

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1

160 rd. $= \frac{1}{2}$ mi. A quarter section is 160 acres.
$(\frac{1}{2})^2 : -^2 :: 160$ A. : 36,000 A.

$$\frac{36{,}000 \times (\frac{1}{2})^2}{160} = 56\frac{1}{4}, \text{ and } \sqrt{56\frac{1}{4}} = 7\frac{1}{2} \quad \text{Hence, } 7\frac{1}{2} \text{ mi.}$$

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2

$6^3 : 36^3 :: 60.5$ lb. : — lb. $\quad \dfrac{36^3 \times 60.5 \text{ lb.}}{6^3} = 13{,}068$ lb.

3

20 in., diameter; $3\frac{1}{7} \times 20$ in. $= 62\frac{6}{7}$ in., circumference.
10 in. $= \frac{1}{2}$ diameter; $31\frac{3}{7}$ in. $= \frac{1}{2}$ circumference.

$10 \times 31\frac{3}{7}$ sq. in. $= 314\frac{2}{7}$ sq. in., area of circle 20 in. in diameter.
$3 \times 314\frac{2}{7}$ " " $= 942\frac{6}{7}$ " " 3 times area of circle 20 in. in diameter.

$314\frac{2}{7}$ sq. in. : $942\frac{6}{7}$ sq. in. :: $(62\frac{6}{7})^2 : —^2$

$$\frac{942\frac{6}{7} \times (62\frac{6}{7})^2}{314\frac{2}{7}} = \frac{580{,}800}{49};\ \sqrt{\frac{580800}{49}} = \frac{762.10+}{7} = 108.87+$$

Hence, 108.87 + in.

4

$1^2 : 5^2 :: 3.1416$ sq. ft. : — sq. ft.

$$\frac{5^2 \times 3.1416 \text{ sq. ft.}}{1^2} = 78.54 \text{ sq. ft., surface of 5-foot globe.}$$

$1^2 : (\frac{1}{2})^2 :: 3.1416$ sq. ft. : — sq. ft.

$$\frac{(\frac{1}{2})^2 \times 3.1416 \text{ sq. ft.}}{1^2} = .7854 \text{ sq. ft.} = 113.0976 \text{ sq. in., surface of 6-inch globe.}$$

5

7 in., diameter; $3\frac{1}{7} \times 7$ in. $= 22$ in., circumference.

$1 : 64 :: 22^3 : —^3$

$64 \times 22^3 = 681{,}472$; $\sqrt[3]{681{,}472} = 88$. Hence, 88 in.

6

$20^3 : 100^3 :: 4{,}600$ cu. ft. : — cu. ft.

$$\frac{100^3 \times 4{,}600 \text{ cu. ft.}}{20^3} = 575{,}000 \text{ cu. ft.}$$

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7

$$4 : 1 :: 24^3 : \text{—}^3$$

$$\frac{24^3}{4} = 3{,}456;\ \sqrt[3]{3{,}456} = 15.119+$$

Hence, 15.119 + ft., required diameter.

8

$$6^3 : 3^3 :: 32 \text{ lb.} : \text{— lb.}$$

$$\frac{3^3 \times 32 \text{ lb.}}{6^3} = 4 \text{ lb.}$$

9

$$32 \text{ lb.} : 500 \text{ lb.} :: 6^3 : \text{—}^3$$

$$\frac{500 \times 6^3}{32} = 15.$$ Hence, 15 in.

10

$$5^3 : 8^3 :: 12 \text{ pailfuls} : \text{— pailfuls}$$

$$\frac{8^3 \times 12 \text{ pailfuls}}{5^3} = 49.152 \text{ pailfuls.}$$